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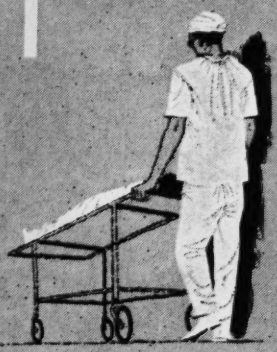
YOU WON'T FIND IT ON THE LABEL



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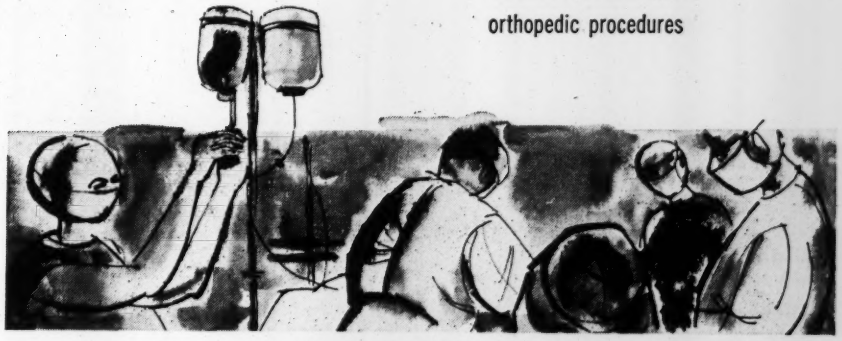
for relaxation of skeletal muscle

in surgery...
electroshock therapy...
orthopedic procedures



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Twenty-Fourth Annual Convention American Association of Nurse Anesthetists

September 30—October 3, 1957
ATLANTIC CITY, NEW JERSEY
Hotel Headquarters — Ritz-Carlton Hotel

PROGRAM

Sunday, September 29

8:00 A.M.-5:00 P.M. —**Registration**
A.A.N.A. Registration—Ritz Hall, Ritz-Carlton Hotel

9:00 A.M.-5:00 P.M. —**Registration**
A.H.A. Registration—A.H.A. Headquarters, Traymore Hotel

9:00 A.M. **Assembly of Directors of Schools of Anesthesia***
Ritz Hall
Clarene A. Carmichael, R.N., B.S.
Educational Director, A.A.N.A.
Presiding Officer

Greetings
Lillian G. Baird
President, A.A.N.A.

Monday, September 30

8:30 A.M.-5:00 P.M. —**Registration**
A.H.A. Registration—Convention Hall
A.A.N.A. Registration—A.A.N.A. Exhibit Booth No. 291, Convention Hall

9:00 A.M.-12:00 noon—**Assembly of Directors of Schools of Anesthesia***
Meeting Room A, Convention Hall
Clarene A. Carmichael, R.N., B.S.
Educational Director, A.A.N.A.
Presiding Officer

2:00 P.M. **General Session**
Meeting Room A, Convention Hall
Lillian G. Baird, R.N.
President, A.A.N.A.
Presiding Officer

Invocation
Sr. M. Honoria
Trenton, N. J.

Address of Welcome from A.H.A.
Edwin L. Crosby, M.D.
Director
American Hospital Association

Address of Welcome
Lillian G. Baird, R.N.
President, A.A.N.A.

*Although this program is of specific interest to Directors of Schools of Anesthesia, ALL members are invited to attend these sessions.

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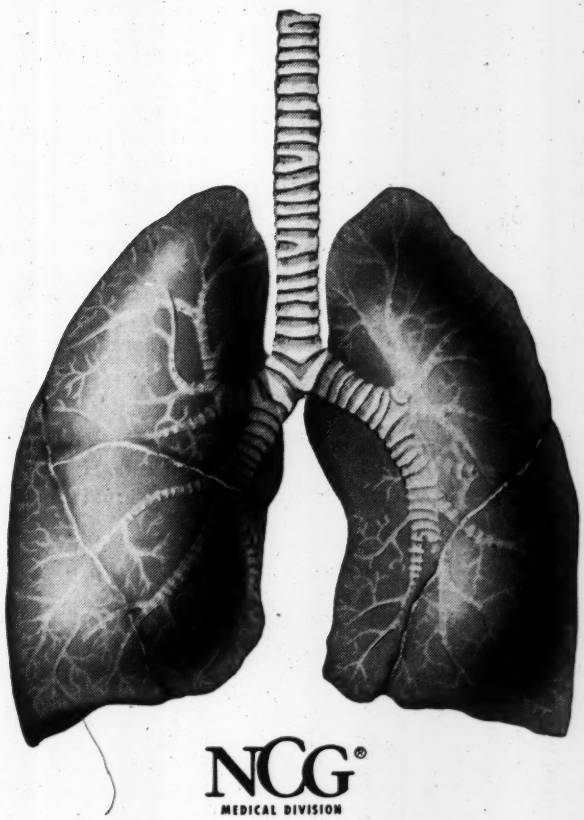

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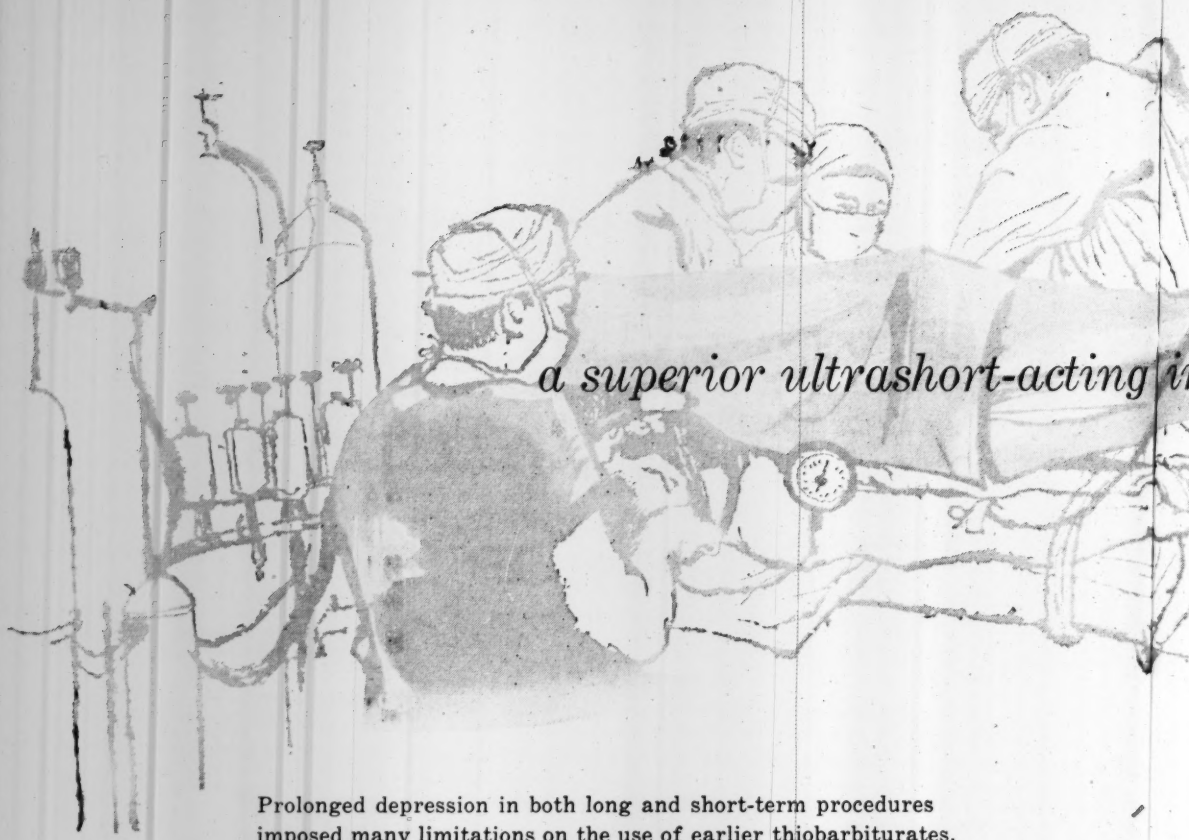

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1. Boone, J.D.; Munoz, R., and Dillon, J.B.: Anesthesiology *17*:284, 1956. 2. Zima, O.; von Werder, F., and Hotovy, R.: Anaesthesist *3*:244, 1954. 3. Fitzpatrick, L.J.; Clarie, D'A., and Mersch, M.A.; To be published. 4. Blake, M.W. and Perlman, P.L.: J. Pharmacol. & Exper. Therap. *117*:287, 1956. 5. Ayd, F.J., Jr.: Neraval: A new anesthetic for electroconvulsive therapy, paper presented at annual meeting, Electroshock Research Association, Chicago, Illinois, April 29th, 1956. 6. Irwin S.; Stagg, R.D.; Dunbar, E., and Govier, W.M.: J. Pharmacol. & Exper. Therap. *116*:317, 1956. 7. Reifferscheid, M., and Dietmann, K.: Deutsche med. Wchnschr. *79*:638, 1954. 8. Dietmann, K.: Deutsche med. Wchnschr. *79*:1748, 1954.

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Monday, September 30

2:15 P.M. Ann E. Starcovic, R.N.
President, West Virginia Association of Nurse Anesthetists
Presiding Officer

The Surgeon and the Nurse Anesthetist
David B. Allman, M.D.,
President
American Medical Association
and
Albert C. Kump
President New Jersey Medical Society
Bridgeton, N. J.

Hazards of the Postoperative Period
Richard H. Barrett, M.D.
Chairman of Section of Anesthesiology
Hitchcock Clinic
Hanover, N. H.

An Anesthesiologist Abroad
Helene D. Mayer, M.D.
Chief, Department of Anesthesiology
Harlem Hospital
New York, N. Y.

7:00 P.M. **State Night Dinner**
Ritz Hall, Ritz-Carlton Hotel
Mrs. Mary Hartmann, R.N.
Chairman, Convention Committee
Presiding Officer

Tuesday, October 1

9:00 A.M. **Business Session**
Meeting Room A, Convention Hall
Lillian G. Baird, R.N.
President, A.A.N.A.
Presiding Officer

Call to Order

Appointment of Tellers

Roll Call

Report of Approval of Minutes Committee

Reports of Officers

Reports of Standing Committees

11:00 A.M.-1:00 P.M. **—Election of Officers**

2:00 P.M. **Business Session**
Meeting Room A, Convention Hall
Lillian G. Baird, R.N.
President, A.A.N.A.
Presiding Officer

Reports of Standing Committees

Reports of Special Committees

Unfinished Business

New Business

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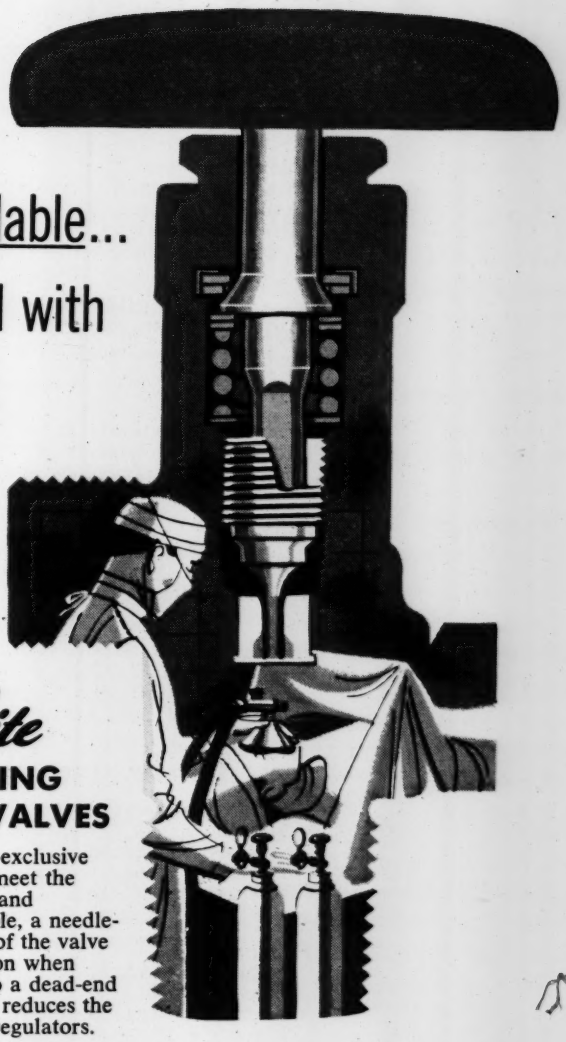

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Wednesday, October 2

9.00 A.M.-12:00 noon —**Council Session***
Meeting Room A, Convention Hall
Florence A. McQuillen, R.N.
Executive Director, A.A.N.A.
Presiding Officer

2:00 P.M. **General Session**
Meeting Room A, Convention Hall
Bernice Pierce, R.N.
President, District of Columbia Association of Nurse Anesthetists
Presiding Officer

What the Ophthalmologist Requires of the Anesthetist
Wendell L. Hughes, M.D.
Clinical Professor of Ophthalmology
New York University
New York, N. Y.

3:15 P.M. **Providing Anesthesia Service in the Smaller Hospital**
Round Table Discussion
Especially arranged by the
American Hospital Association

7:30 P.M. **Banquet**
Crystal Room, Ritz-Carlton Hotel
Lillian G. Baird, R.N.
President, A.A.N.A.
Presiding Officer

Invocation
Reverend Harry Pine
St. Paul's Methodist Church
Atlantic City, N. J.

Thursday, October 3

9:00 A.M. **General Session**
Meeting Room A, Convention Hall
Mrs. Irma Brose, R.N.
President, Pennsylvania Association of Nurse Anesthetists
Presiding Officer

Pain
John S. Lundy, M.D.
Senior Consultant
Section of Anesthesiology
Mayo Clinic
Rochester, Minn.

The Use of Respirators in Anesthesia
Donald W. Benson, M.D.
Anesthesiologist-in-Charge
The Johns Hopkins Hospital
Baltimore, Md.

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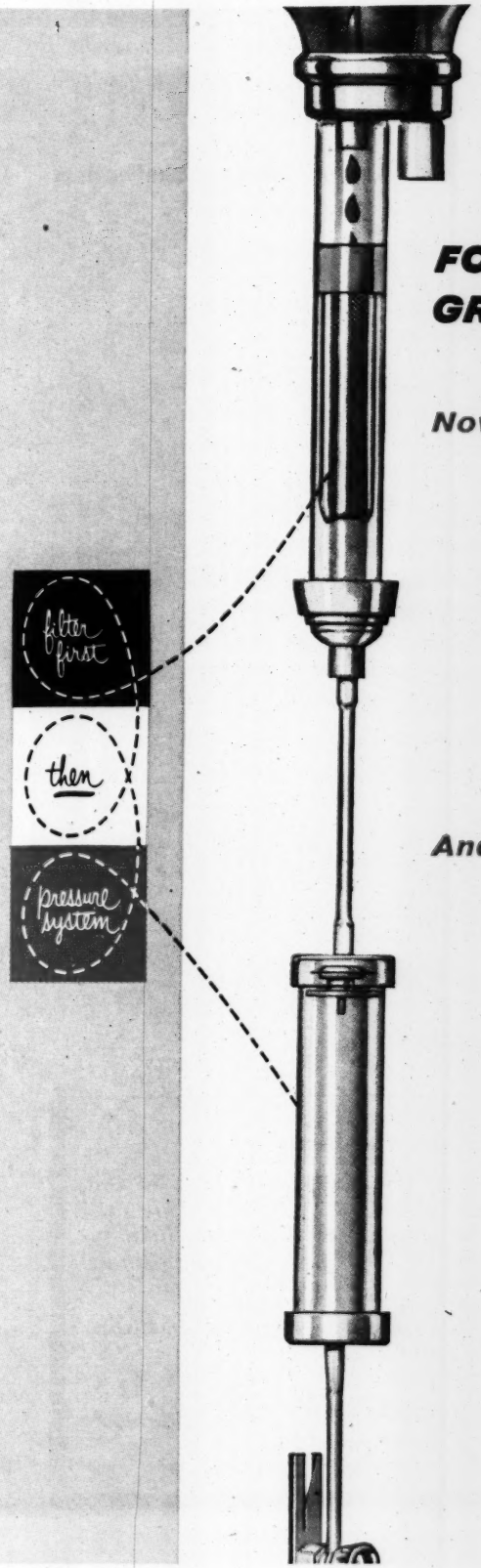
*Although the Council, as provided in the By-Laws of the A.A.N.A., consists of officers and standing committees of national and state associations, the Council Session is open to all members and restricted to members of the A.A.N.A.



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Thursday, October 3

10:30 A.M.

The Tranquilizers
Mary A. Costello, R.N.
Director, School of Anesthesia
Cincinnati General Hospital
Cincinnati, Ohio

Anesthesia in a Psychiatric Hospital
Edward J. Tracy, R.N.
East Islip, L. I., New York

2:00 P.M.

General Session
Meeting Room A, Convention Hall
Rosemary Armbruster, R.N.
Vice-President, Missouri Association of Nurse Anesthetists
Presiding Officer

The Anesthetist as a Professional Person
Janet Geister, R.N.
Chicago, Ill.

Psychology and the Nurse Anesthetist
Cameron W. Meredith, Ph.D.
Director of Educational Psychology
State University of New York
Oswego, N. Y.

The Rules We Live By
Lillian G. Baird, R.N.
President
A.A.N.A.

4:00 P.M. —Unfinished Business

4:15 P.M. —Adjournment of General Session

Call to the Convention

As provided for in the Bylaws of this Association, and at the direction of Miss Lillian G. Baird, President, we hereby issue this official call to the members for the annual meeting to be held in Atlantic City, September 30-October 3, 1957. The annual business session will be held on Tuesday, October 1, in the Convention Hall.

Accomplished at the Executive Offices, Prudential Plaza, Chicago 1, Illinois, this first day of July, 1957.

Florence G. McQuillen

Executive Director

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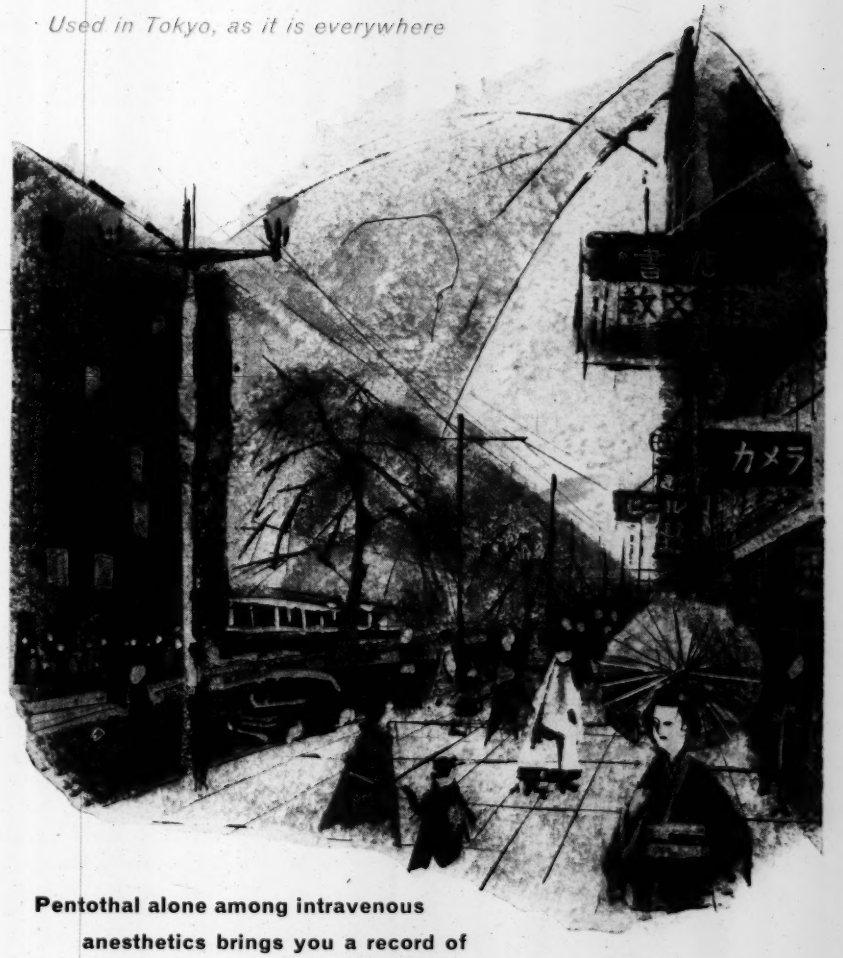

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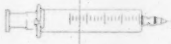

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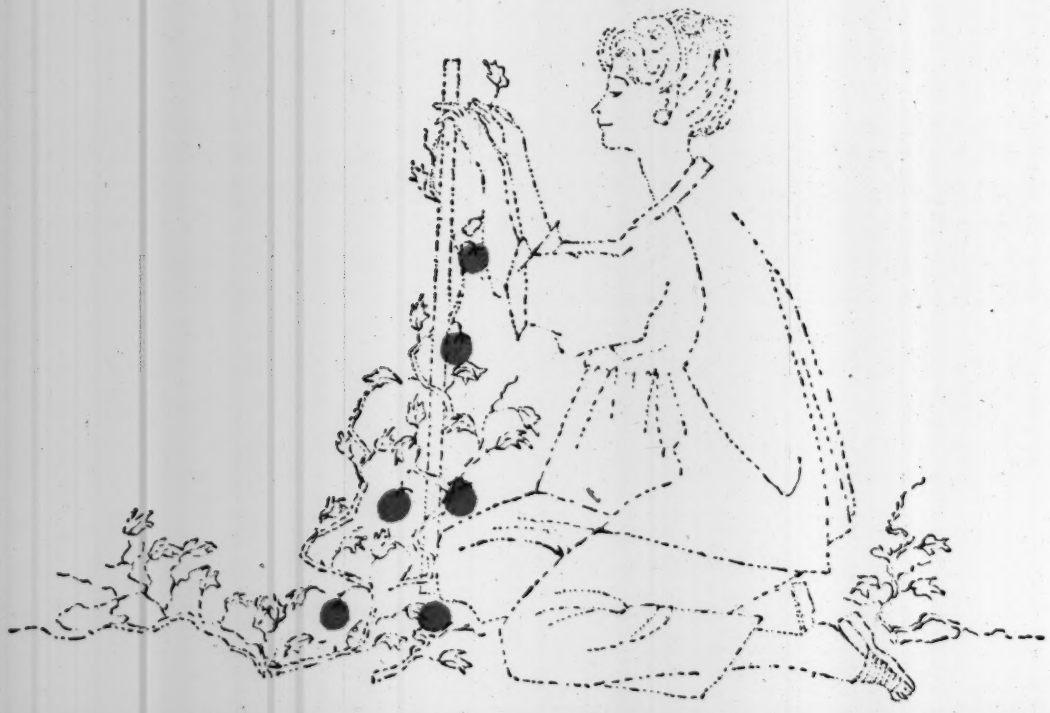

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General Anesthesia for Cleft Lip and Palate Repair

Clarence W. Monroe, M.D.*
Oak Park, Ill.

From the surgeon's point of view the essence of this paper could be summed up in 4 words: Get Them to Sleep. I shall try to make clear why these four little words are valid.

Most surgeons prefer to repair a cleft lip within the first 3 months of life and an increasing number within the first few days of life. The giving of anesthesia to the neonatal infant requires a technic which one does not necessarily know just because one has given a great deal of adult anesthesia. Most anesthetists with whom I have worked who give only occasional infant anesthetics find themselves well-nigh lost and extremely reluctant to have the patient actually under surgical anesthesia. The majority feel that if the patient is unconscious the surgeon should be able to do his work.

Infants actually tolerate anesthesia very well if properly prepared for it. Preparation requires an empty stomach and little else. My own preference is to have the baby's last feeding about 4 to 5 hours before the projected surgery. In infants under 3 to 6 months of age we often omit atropine but do use scopolamine gr. 1/600 to 1/500 in infants up to 6 months of age.

In the induction we usually use either ethyl chloride or vinethene which is promptly changed to ether when the patient is unconscious and breathing regularly. As the change is made to ether, the infant with a stomach full of water or milk usually begins having trouble; and this is not necessarily manifested by vomiting. Often there is only a marked irregularity in respiration—the cause for which is not apparent until the patient may vomit after 5 to 10 minutes of irregular respiration and unsatisfactory increase in depth of anesthesia. After the stomach is empty, the anesthesia usually progresses much more smoothly. As the plane of anesthesia deepens more smoothly and rapidly, some surgeons have great difficulty restraining themselves.

One of the major obligations of the surgeon at this point is not to start preparing the patient for the surgical procedure until the anesthetist actually has the patient down to a plane where surgery may be carried on without causing movement of the patient. This one point causes about three-fourth of the arguments between anesthetists and surgeons. Each, in my

*Chief of the Division of Plastic Surgery in the Department of Surgery, Children's Memorial Hospital; Associate Attending Surgeon, Presbyterian Hospital; Consultant in Plastic Surgery to Shriner's Hospital for Crippled Children, Chicago, Illinois.

Presented at the Tri-State Assembly of Nurse Anesthetists Meeting, Chicago, April 29, 1957.

view, has a very specific obligation. The anesthetist must get the patient down to the plane of surgical anesthesia and should do it with reasonable promptness commensurate with safety for the patient. If this means the hour for starting surgery is later than the surgeon prefers, the only answer is to come to an agreement with the anesthetist about starting earlier. The 5 or 10 minutes before surgical anesthesia is achieved is not the point at which the operation may be hastened. The surgeon must withhold any stimulation of the patient until the anesthetist states the patient is ready. If each could always expect this much consideration and co-operation from the other, then there would be far fewer anesthetic difficulties.

As to the specifics of anesthesia for repair of a cleft lip, my personal preference is that the anesthetist be scrubbed with me in the case and actually hold the tongue and jaw to insure an adequate airway. When the anesthetist does not do this, then my assistant or myself must assume this responsibility. Usually there is enough for each of us to do that I prefer having the anesthetist care for keeping the airway open. She then gives ether-oxygen by insufflation to maintain the level of anesthesia. My assistant assumes the responsibility for keeping the airway free of blood and secretions, since he has the suction constantly in hand.

Some anesthetists feel they cannot control the anesthesia adequately when scrubbed into the case. I feel they actually have better control, but in one institution in which I work they insist that the anesthesia be given by nasal catheter and they stay out of the field, sometimes trying to support the jaw from beneath the drapes. It usually eventuates that my assistant or I spend much of our time under these circumstances tending the airway.

It is precisely because of difficulties encountered in this type of anesthesia that I resolved to learn how to use local anesthesia for the repair of cleft lips. I must confess I have found it so much more safe and satisfactory that I have even changed to using it in the institution where I have excellent help in general anesthesia. For the infant under 3 months of age such local anesthesia works beautifully as a rule. Beyond 3 months it is pretty difficult to manage the patient with local anesthesia.

Returning to the patient under general anesthesia, let us suppose the operation is now in progress. A few words need to be said at this point about the patient who does not stay quietly asleep during the course of the operation. There are, of course, some problem cases which will be difficult for both the anesthetist and surgeon to manage no matter how competent each may be.However, the great bulk of patients can and will be managed smoothly if the anesthetist is willing to keep the patient completely asleep and the surgeon is meticulous about keeping the airway clear. There are two situations here which bode ill for the patient. When the anesthetist lacks the ability or willingness to keep the patient soundly asleep, then very little stimulus by the surgeon produces some irregularity in breathing. As the anesthesia is lightened the patient is in danger of developing laryngospasm from the surgical stimulation. The surgeon has to stop his work; and the anesthetist should promptly, but gradually, put the patient down again. If, instead, the surgeon keeps on with his work or the anesthetist hesitates about getting the patient under again, the

patient is very likely to begin gagging and vomiting. Even with the greatest alertness by surgeon and assistant the patient is almost certain to aspirate some of the vomitus. This produces marked irritation of larynx and trachea; and it is, therefore, more difficult to get the patient deeply asleep again. The surgeon should wait until the patient is quiet again before proceeding with his work. But while he is waiting the anesthetist should really be putting the patient down again. If she wavers at this point and tells the surgeon to proceed when the patient has only begun to quiet down, there is very likely to be a recurrence of gagging and again of vomiting and increasing hazard of laryngospasm for the patient.

I have had an anesthetist say to me under these circumstances, "Well, you wouldn't want me to get the patient so deep he would stop breathing—you wouldn't like that." So instead she prefers to kill the patient more slowly with an aspiration bronchopneumonia! Actually my own preference would be that if one must err one way or the other it should be on the side of having the patient too deeply asleep. A little positive pressure with a mask and rebreathing bag will bring the patient back very quickly, and there are then no stomach contents in the lung to produce a pneumonia. Once the patient has aspirated gastric juice it is extremely difficult to get it out of the lungs completely, and the patient is quite certain to have some post-operative morbidity.

Actually, tracheal reflexes are the last to be abolished under general anesthesia, yet they must be abolished if smooth anesthesia and safety for the patient are to be secured—especially for work in the mouth.

The other side of this coin about having the patient deeply asleep involves the surgeon. If he permits blood and saliva to collect in the throat, or gets so busy with his work that he pushes the jaw and tongue back into the pharynx, or fills the pharynx so full of packs controlling bleeding that he shuts off the airway, the anesthetist has no choice but to let the patient out. Except in the event of severe, acute hemorrhage there is never any excuse for the surgeon to bull ahead with his operative procedure when the patient is not doing well. He may be angry at his assistant, the nurses, the anesthetist, or himself, but he may not take it out on the patient. Surgery is always a co-operative endeavor but seldom more so than when both the surgeon and anesthetist must work on the small mouth of an infant.

This discussion would not be complete without some discussion of endotracheal anesthesia. It can, of course, be used in small infants for lip repair; but Dr. Holinger's caution about the use of endotracheal tubes is well worth remembering. Edema of only 1 mm. of the vocal cords of an infant reduces the area for respiratory exchange by 1/4. It behooves us, therefore, to intubate gently and with the correct size tube. I have never actually used intubation in the repair of a newborn's cleft lip. I have, however, recently used it for repair of the palate of which more later.

In most clinics over the country the repair of a cleft palate is not undertaken until the patient is 1 to 2 years of age. Some few patients may be considerably older. From an age standpoint anesthesia should be easier. Practically it is not, however, because the repair of the palate requires much greater relaxation of the patient than does repair of the lip. Unless the patient is down deeply

enough for the gag and tracheal reflexes to be completely abolished, then the anesthesia and the whole operative procedure will be a very hectic performance.

Everything which has been said about depth of anesthesia for lips applies doubly here. All that was said about the surgeon not being constantly aware of the airway becomes triply important here. He has so much more opportunity to get into and obstruct the airway now without half trying. It is easy to see that if he is just a little careless and the anesthetist is just a little timid about putting the patient to sleep, then the patient is going thru a very hazardous procedure. A little blood and mucus in a larynx which is not quite asleep adds up to laryngospasm, coughing, gagging, and vomiting. If the patient survives the inept handling of his operative team, then we should all pray that the organisms which start to grow on his lung tissue partially digested by gastric juice will prove susceptible to the antibiotic which is the current choice for routine administration by the resident surgeon who writes the post-operative orders.

If endotracheal anesthesia is used for palate repair, much of this hazard to the patient is removed. He can be carried on much lighter anesthesia, his color stays much better at all times. Endotracheal anesthesia certainly adds to the technical difficulties facing the surgeon. Working in the narrow confines of the mouth is seldom easy, but it has seemed to me a good deal more difficult with an endotracheal tube in the way. However, I am learning to work around it; and I believe that with further practice I shall come to prefer it over insufflation. Certainly I have not had the queasy moments which fairly often come to me when the patient is carried rather lightly under insufflation. The patient, therefore, always seems safe. However, it must be remembered that inadvertent loss of the tube from the trachea with the patient so light could present a very major problem. If it were to happen in the midst of appreciable bleeding, the patient could be in real danger before he could be gotten deep enough for re-insertion of the tube.

Have I stated things too bluntly or fearfully? I think not. We are talking about a difficult type of surgery where three big people try to gather about a single small aperture in a baby's face to repair a defect left by nature. Anesthetic and functional repair must be made in that aperture while the patient continues to use it for breathing. This calls for co-operation of the highest order between anesthetist and surgeon. If each appreciates the other's problems and both try to solve them working in harmony rather than discord, the result can be very wonderful for the patient and a truly enjoyable accomplishment for both anesthetist and surgeon.

Drug Administration During Anesthesia

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Our discussion, as the title implies, is drug administration during anesthesia. We are concerned, primarily, with application in the operating room of clinical pharmacology.

In some hospitals, the anesthetist's position is one of reporting the patient's condition to the surgeon and the latter prescribes drugs accordingly. In other hospitals, the anesthetist, nurse or doctor, is entirely responsible for administration of such drugs and anesthetics as will maintain the patient in the proper plane of anesthesia, relaxation, and the optimum physiological condition. In either event, it is necessary that the anesthetist be familiar with the systemic effects of all medications that are given. Only when we know the expected result of a medication can we evaluate properly the patient's ability to respond and thus better understand the condition. Remember, each patient is an individual who reacts independently of the laws of statistical averages, the latter being a mean result of hyper-reacters and hypo-reacters.

At this point some generalizations are in order. Maintain your patient's pulse, respiration, blood pressure and color as closely within normal limits as possible at all times. Noxious reflexes, hemorrhage, laryngospasm, bronchospasm, cardiac arrest, etc. can change the clinical picture in seconds. Whereas the patient's condition previously may have been maintained at fair to poor, intervention of the above abruptly precipitates a critical situation.

Infant and geriatric patients must be observed especially well. Unlike the average young healthy adult, they tolerate abuse up to a point and then rapidly deteriorate. Sudden changes, especially in the aged, arteriosclerotic, or hypertensive patient, in pulse, blood pressure, or oxygenation may result in coronary thrombosis, cerebral anoxia with sequelae, cerebral hemorrhage, etc. Remember, also, the tolerance to drugs is usually less in the extremes of age, young and old.

Above all else, drugs are not a substitute for a well chosen, well administered anesthetic. Polypharmacy is second choice to good anesthesia.

The drugs we discuss today come

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under a number of main groupings.

Under each group, the drugs may be used interchangeably, frequently according to one's likes, dislikes and experience. You already know the general indications for most of these drugs, so let us simply relate some of their more specific indications and contraindications.

Sympathomimetics

1. **Ephedrine**:—For reflex hypotension with pulse below 76/minute give 10 mgm. intravenously and 15 to 25 mgm. intramuscularly.
2. **Vasoxyl**:—For hypotension with pulse at 96 or more per minute, give 2 to 5 mgm. intravenously and 10 to 15 mgm. intramuscularly.
3. **Methamphetamine (Desoxyn, Methedrine, Drinalfa, etc.)**:—For hypotension with pulse between 76 and 96/minute. Intravenously, the above drugs act for approximately 20 minutes. The intramuscular injection acts for approximately 60 minutes.
4. **Neosynephrine**: — This drug is best used for reflex hypotension, as may occur with visceral traction, where the expected period of hypotension will be 10 to 30 minutes. Results may be obtained with intravenous injections of 1/8 to 1 mgm. The usual injection being ¼ to ½ mgm. Intravenously the pressor effect lasts 10-15 minutes; intramuscularly, about 30 minutes.
5. **Levophed**: — This drug is extremely potent and is used with caution only when blood transfusion and other vasopressors are ineffective. One ampule, four mgm., is diluted in 500 to 1000 cc. of 5% glucose in water, or physiological saline. This solution is run intravenously at 10 to 30 drops per minute. Blood pressure must be checked every one to five minutes. Remember, the patient must be "weaned" away from this powerful crutch gradually. Check blood pressure regularly for one to two hours after discontinuing to be certain there is no secondary drop.
6. **Adrenalin**:—There is little use in the anesthetists armamentarium for this drug. In asthmatic attacks, when cyclopropane is not being used, it may succeed where aminophyllin and antihistiminics fail. Intravenous succinylcholine chloride will frequently help increase the respiratory exchange aided by assisted or artificial respiration.

Cholinergics

Prostigmin 1:2000 and Tensilon in doses of 1 c.c., repeated once if necessary, tend to counteract the action of curare-like drugs by inhibiting cholinesterase activity. They may prolong the activity of succinylcholine chloride. It should rarely be necessary to use these as antidotes for curare. If you use them often, you are misusing your muscle relaxants. Bronchial asthma is a contraindication to their employment. Duration of action may be short and secondary curare depression can occur. Follow up the case.

Anticholinergics

Atropine and scopolamine, in addition to their preoperative use as drying agents and medullary stimulants, may be used during anesthesia for the same purpose. Scopolamine has the added advantage of giving greater drying effect, more amnesia and more cortical depression. Atropine, however, has a greater vagal blocking effect and, therefore, is more

useful in cases of bronchospasm, reflex bradycardia, and reflex hypotension with a slow pulse. Results are obtained with doses as little as 1/300 gr. intravenously and up to 1/75 gr. may be necessary for severe vagal reflexes.

Narcotics

Tachypnea and tachycardia under general anesthesia have been treated with opiates, particularly morphine. However, look for the etiological factors before treating the symptoms. Carbon dioxide accumulation, too light a plane of anesthesia, hypoxia, etc. must be corrected before opiates are considered. These drugs find their best application preoperatively and during surgery under local or block anesthesia. They are not a substitute, however, when the latter fail in their objective; supplemental general anesthesia is advisable.

Narcotic Antagonists

Two preparations are in general use today: Nalline and Lorfan. Nalline is subject to narcotic regulations; Lorfan is not. Nalline abolishes analgesia as well as depression; Lorfan does not abolish analgesia. Both drugs used to excess will cause depression of respiration. Lorfan, used alone without the presence of a narcotic will result in respiratory depression. Neither product is effective against respiratory depression due to anesthetics or barbiturates.

Nalline is given in doses of 5-10 mgm. 1-V or 1-M and repeated in 20-30 minutes up to a total of 30-40 mgm.

The following narcotic-Lorfan dosage ratios are recommended:

Morphine/Lorfan 50:1 (15 mgm. morphine to 0.3 mgm. Lorfan)

Demerol/Lorfan 100:1 (100 mgm. Demerol to 1 mgm. Lorfan)

Levo-Dromoran/Lorfan 10:1 (3 mgm. Levo-Dromoran to 0.3 mgm. Lorfan)

Cortisone Preparations

Since the advent of cortisone preparations and ACTH we may expect an ever increasing danger of acute adrenal insufficiency syndromes in the operating room. Patients who have had specific therapy with these drugs within one year prior to surgery may be in a state of borderline adrenal insufficiency that can be precipitated into an acute phase by severe physiological strain, of which anesthesia is an excellent example. Normally replacement therapy should be started two to three days before operation and then gradually tapered off afterward. When past history is unknown or questionable (from the patient's chart) and acute severe circulatory depression occurs shortly after onset of anesthesia, or during surgery, for no apparent reason, I feel it is empirically wise to administer hydrocortisone intravenously. There are two preparations on the market. One contains hydrocortisone, 100 mgm. in 50% alcohol, and must be diluted in 500 or 1000 cc. of 1-V solution. The other is a powder that can be diluted in 2 cc. of sterile water or saline and injected intravenously in one to two minutes. Some of the contraindications to the use of adrenal steroids are diabetes mellitus, peptic ulcer, tuberculosis, chronic nephritis, etc.

Muscle Relaxants

You are all familiar with muscle relaxant drugs, having used them on numerous occasions. Milligram or unit per pound or kilogram scales have been published regarding dosage. You must consider the number of units per cubic centimeter as your best guide since mgm. per cc. vary

with different preparations. d-Tubocurarine chloride is normally prepared in 3 mgm/cc. concentrations with a potency of 20 units/cc. A high potency preparation of 15 mgm. or 100 units/cc. is also on the market. Metubine and Mecostrin, on the other hand, are prepared with 1 mgm./cc., with a potency of 20 units/cc. The latter two compounds, unit for unit, have an activity period about 15 minutes shorter than d-Tubocurarine.

Flaxedil, a synthetic curare-like product, is marketed in solutions containing 20 mgm. per cc. and 100 mgm./cc. The former is used most commonly. Advised dosage is 1 mgm./kilogram of body weight. Flaxedil does not exhibit the histamine-like reaction of bronchospasm occasionally seen with curare.

Succinylcholine Chloride is marketed as Anectine, Quelicin, and Sucostrin in vials with 20 mgm./cc. and multiple dose ampules of 10 cc. containing 50 mgm. or 100 mgm./cc. For a continuous-drip procedure, concentrations of 1 mgm. or 2 mgm./cc. can be used; the latter when limited fluid administration is desired. A flow of 2-4 mgm./minute usually gives the desired amount of relaxation.

A word of caution is advisable here regarding the use of curare preparations. Always administer a test dose of 3 to 5 units. Cases of myasthenia gravis do not tolerate curare and react with severe prolonged paralysis and circulatory depression. Know, also, your surgeon and surgical procedure. Judge the dosage and time of administration so that the activity of your drug is about at an end when the surgical procedure is over.

Respiratory Stimulant

A brief note should suffice the use of respiratory stimulants during anesthesia. They are rarely necessary. Diagnose the cause first and then act accordingly. If respiration is depressed due to premedication, manual supplementation of respiration will adequately cover the situation. If depression is severe, Nalline or Lorfan is indicated. Manual supplementation of respiration is also indicated for depression due to curare, deep plane of anesthesia, or excessive amounts of intravenous barbiturate until the action of these drugs is diminished by time.

Picrotoxin, 3 mgm./cc., in doses of 1 to 2 cc. intravenously stimulates for 15 to 30 minutes. Metrazol, 1 to 3 cc. intravenously, stimulates for 10-20 minutes. These may be used for barbiturate depression. Coramine (25% solution of Nikethamide), 1 to 3 cc., intravenously, is perhaps better for depression due to the volatile anesthetics than to barbiturates. Caffeine with Sodium Benzoate gr. 7½ and aminophylline gr. 3¾ to gr. 7½ also stimulate respiration. The latter is useful in cases of asthma and bronchospasm during anesthesia.

Antihistamines

While there are numerous preparations on the market for antihistaminic action, we need mention only a few. Benadryl Hydrochloride, 10 mgm./cc., 1 to 5 cc. intravenously or intramuscularly and chlor-trimetron, 10 mgm./cc., 1 to 2 cc. intravenously or intramuscularly are commonly used in allergic conditions, i. e., drug and blood transfusion reactions and asthma on an allergic basis. Marezine, 50 mgm./cc., intramuscularly, and Phenergan, 25 mgm./cc., intravenously or intramuscularly, have been promoted as agents to reduce post operative nausea and vomiting. Phenergan, in addition, potentiates the action of narcotics and barbiturates.

Thus, smaller amounts of the latter drugs may be used because of its sedative action.

In conclusion, let me add a few words of precaution. Most of the preparations we have mentioned today are potent drugs. Those we give intravenously show evidence of activity in just a few minutes. Recognizing that patients are hypo-reactors and hyper-reactors start with smaller doses and increase the amounts when necessary for the desired action. Once a medication has been injected, it can not be recalled.

Psychological Aspects of Pediatric Anesthesia

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Great changes have taken place in the world, and in the lives of all its people since Morton demonstrated ether anesthesia. These changes have made the responsibility of those interested in human life more serious and more important than it has ever been before. This responsibility is most grave for those who must take another person's life into their hands in order to create a comfortable environment in a situation where sensory perception would be otherwise unbearable. When faced with the task of administering an anesthetic to a child the seriousness and responsibility is doubly increased.

The anatomy and physiology of the child are not fully developed so the drugs administered are subject to variable and unpredictable responses. The patient has a poor tolerance to the bodily changes caused by the drugs that must be given, and to the traumatic effects of the surgical procedure. But we would agree, I think, that the psychological effects aroused in the child in preparation for the surgical procedure are of even greater importance.

You know that a patient who is poorly prepared psychologically, for surgery, can add ten years to the anesthetist's life. The course of an anesthetic is influenced by the course of the induction. A stormy induction will result in a stormy course of maintenance, a disturbed surgeon, and an unhappy anesthetist.

This all important aspect of anesthesia, the psychological aspect, has been controlled by what some call "adequate premedication". That is to infer, and rightly so, that the premedication drug must be of sufficiently great strength to control the individual patient's emotional state. But you must remember that the drugs that quiet the emotional responses will also quiet the patient's vital functions. Therefore it would seem better to influence the child's emotional condition by a safer method. This safer method would be by the use of skill and ingenuity.

Before you attempt to administer an anesthetic to a child you must understand the whole situation that the patient experiences, before he is ready to be anesthetized. The child is not an abridged edition of an adult. He is a complete individual entity, physically, socially, spiritually, and psychologically. Perhaps it would be more correct to say he is an extremely alert and sensitive individual. A

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child is alert to all things around him. He is especially sensitive to the emotions, moods, and tensions of the people about him. To approach a child in a state of apathy, rejection, or hysteria, is to turn him into your most violent adversary. He will reflect your emotions and return them in kind. Only love and a sincere interest in him as an individual will win his cooperation. He will give back as much as you give to him.

The physical disturbance that forced the child to be hospitalized is the initiating factor in a long line of unusual and confusing experiences that have befallen him. This disturbance is not only unusual but may be physically painful. The strangeness of the events cause uncertainty and destroys confidence. By necessity, the child must be separated from his parents and separation from parents is the most agonizing misfortune that can befall a child. Extreme care must be exercised to guard against permanent emotional trauma from this experience of separation. The parents are the child's source of love and his protection against unknown things. They are the persons whom he has loved and completely trusted. Separating the child from love and protection removes the entire foundation from under the child's life. Though the parents may tell the child why separation is necessary and what the hospital stay will be like, it is unlikely that he would be able to understand and be prepared to face the whole situation. Removed from his source of love, this desire cannot be fulfilled. He is driven to panic and a frantic search for his parents. Not finding them, his despair makes him suspicious and uncooperative. He cannot be certain that his parents will return, or that they will ever take him home. He becomes suspicious of everyone.

To add further assault to the child's emotional state, he is confined to a strange bed, in an unknown place that is filled with strange sights, sounds and smells. He must eat unfamiliar food, and sleep at odd hours. An endless number of unknown persons question, examine, and care for him.

If a child should lose his parents by death, hurried arrangements would provide him with substitutes for this important source of love. The substitute parents would have to be the type who could supply this love. The separation caused by hospitalization has the same effect on the child. Who will provide this security among the numerous persons he encounters in his hospital? His need for love is greater, considering the multitude of new experiences he will go through during his hospitalization.

Often you have heard complaints of the pediatric patient being "uncooperative" or "unapproachable". But the abnormal situation of hospitalization could hardly be expected to result in any but an abnormal reaction in the child. It is quite surprising that a child survives this experience as well as he does. A child is not by nature unapproachable or uncooperative. It is the uncertainty and bewilderment of the hospital situation that frightens him. Fear and the loss of love would cause anyone to exhibit abnormal behavior. An understanding person working with a child in this situation can lessen his fear by showing understanding, love, sympathy and kindness.

Admittedly it will take time to win the cooperation of the emotionally disturbed child. And considering the whole situation you could not expect to find a patient who was not disturbed. You cannot dispel within a few minutes after meeting, the fear

that has had so long a time to grow within the child. It will be time well spent. To ignore the emotional disturbance the patient is suffering is to accomplish only part of your job. You must take time in order to soothe and reassure the child. There is no advantage gained by approaching the pediatric patient in swift, harassed movements. Love is the weapon that will destroy fear. Love is reflected only by tenderness. Your approach to the child must be reassuring, your voice warm, your interest sincere. If the child should refuse to recognize you upon your first meeting you must make a second or third. It is possible that the child's emotions are so greatly disturbed that he cannot at once be certain that he can trust you. If your interest is sincere, your love dauntless, perserverance will win the cooperation of the most disturbed patient.

It is unfortunate that the anesthetist is not able to meet the child at the moment of his hospital admission, before he experiences the mass confusion that constitutes his introduction to hospitalization. But such arrangement would be impracticable in most hospitals. Therefore the anesthetist must postpone introduction to the patient until the pre-operative visit. This visit, which occurs in the middle of the child's hospital experience, must overcome a great amount of fear that the child feels. It is the successful pre-operative visit that makes the anesthetist more than a hospital technician.

Experience in meeting children is invaluable as an aid for putting the anesthetist at ease in the child's presence. Though it may sound strange to think that an adult could be ill-at-ease in the presence of a child, recall the number of adults that revert to "baby-talk" or other indications of lack of poise, when they are introduced to a child. A child may not be completely developed physically, but he is not an unintelligent person. You do not have to become a child for him to understand you. Sincerity on your part will prove to the child that know him to be an important individual, will establish good rapport.

Conversation during the visit helps you gain insight to the child. Discussion of his school life will indicate his ability to live with other children and superiors, as well as his social consciousness and self confidence. Talk of his family will give you a clue to his state of happiness and his need for love. But any subject you can find to put the child at ease will tell you how he truly feels, what he needs and what he expects from you.

Occasionally you will meet a child who is listless or who appears not to care particularly what goes on around him. This is a manifestation of resignation of a severely disturbed emotional state. The child's emotions are so traumatically affected by the separation from his parents and the frightening hospital experience that he becomes intraverted and uncommunicative. He may even refuse to recognize his visiting parents. This situation may be mistaken as "good adjustment" to hospitalization, but the emotional state will be exposed when he faces another crisis. This may be during the induction of anesthesia. Regardless of how well or how poorly the child appears to adjust to hospitalization, the same effort must be made to love and sympathize with him.

During the pre-operative visit then you must never lose sight of the fact that the child may be undergoing severe emotional adjustments. There are fears and worries that he will not

admit to himself. It is wise to follow the child's conversation rather than direct his thoughts. Allow him to direct the conversation and make your contribution a reflection of his thoughts rather than leading him into certain conversational pathways. The freedom to talk unrestrictedly will allow him to air his inner conflicts and destroy these worries by exposing them to the light of admission. After he has talked out his feeling freely, you will find he can adjust to the situation with surprising maturity. If he is allowed to harbor these fears within his subconscience, severe and permanent emotional trauma may develop. During the pre-operative visit the anesthetist must consider more than what anesthetic agent would be best for this patient, but also how the child can benefit in his post-operative and post-hospital life.

After rapport has been established and the patient has been allowed to air his fears, he should be allowed to discuss the things that are of most interest to him. The ease that he gains from such a conversation will help him gain some of the self confidence that had been shaken from him during the previous hospital experiences.

The thoughts of surgery and anesthesia are of great consequence for every patient. But to the unprotected patient these thoughts can be extremely frightening. When explaining the procedure of anesthesia you should describe every step of the pre-induction activity. Honesty in telling him exactly what will be done and why it will be done is obligatory. It is fear of the unknown that is hardest for the patient to bear. Explanation of the entire procedure will help to reduce the fear.

You should not lie to a child or belittle him by ridiculing his fears or his inability to face this frightening event without losing courage. To caution him to be a "good child" would prove the remonstrator was a feelingless individual as well as a thoughtless one. An operation is of great import and consequence to the child. The child must understand clearly, why the operation is necessary, how long it will take, what the after effects will be, and how he will feel after the operation. When he recognizes that you are honest and sincere he will not be suspicious of your explanation. There is nothing left that is unknown to him, and his attitudes can be more positive.

When explaining the procedure the patient will undergo, you will find that proper words of description will add comfort to the child. Everyone is affected by word association. Every word we hear causes us to recall or associate other words or experiences. Though these associations may not be brought up to the level of consciousness, their presence in the subconsciousness is of great effect. Words such as cut, and blood are obviously words that would collect undesirable thought associations, but subtle examples of this type of word would be mask, stick, or clamp. It is wise to substitute other words that are not as descriptive. "Make a hole" might be substituted for cut, or mosquito bite for needle stick. You are not minimizing the procedure but rather you are limiting the situation to its real effect without associated thoughts.

You have all seen and understood the need for the pediatric ward to have a great number of toys within easy reach of the hospitalized child. These toys are distractions for the child, but more important they are

used by the child to vent his emotions. The toys may receive severe mishandling or may be smothered with love; or they may receive these two conflicting treatments in momentary mixture. You can realize the importance these toys play in the intimate life of the child. The toys are old friends to the child. They are friends that are, like humans, filled with both good and bad associations. He loves them and hates them. But without doubt they are a real comfort to this lonely, unprotected child.

At St. Francis Hospital in La Crosse, Wisconsin, we thought that the comfort the child gains from those toys in the ward could offer the same effects in the surgery suite. We choose 5 toys that appeared to be in most demand. These were not the most beautiful toys, but were doubtless the ones that offered the greatest comfort and association to the child's inner life.

We have taken these toys and fitted them with attachments that could be connected to a source of anesthesia. It is not the idea to steal the child into the state of anesthesia by the use of toys, but rather to offer him companionship through the adventure of anesthesia. The child is told the whole truth about the toy; how it will help him to enter into anesthesia. To think that this toy that has played so many varied parts in the child's fantasies is now able to help give him an anesthetic, fills the child with delight. Anesthesia is an adventure to be enjoyed. The security and companionship of this old friend, the toy, puts the child into a more relaxed receptive state.

General Anesthesia in Dentistry

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From time immemorial man has sought to assuage grief and pain by various drugs. Ethyl-ether was discovered by Valerius Cordus in 1540, and nitrous oxide by Joseph Priestly in 1772; but it was not until 1800 that Sir Humphry Davy discovered the anesthetic properties of nitrous oxide.

In 1844, Horace Wells, Hartford dentist, demonstrated the effective use of nitrous oxide for general anesthesia. On October 16, 1846, another dentist William T. G. Morton, a pupil of Wells, appeared before a distinguished medical group at the Massachusetts General Hospital, and electrified his audience by anesthetizing the patient with ether for the removal of a tumor of the neck.

In recent years the progress in anesthesiology has been rapid. Tremendous strides have been made in the discovery of new anesthetic drugs and technics to complete an effective arsenal for our unremitting war against operative pain.

The practice of oral surgery is unique insofar as practically all of the operations included in its category are performed in private offices upon ambulatory patients who have had neither preparation nor premedication.

It is neither feasible nor necessary for a patient to undergo a thorough physical examination in the dental office such as is imperative before administration of an anesthetic for major surgery in a hospital.

The average duration of oral surgical procedures rarely exceeds 5 minutes and at times less than that. Muscular relaxation demanded for general surgery is seldom required in the dental office.

For most normal patients requiring minor oral surgery of short duration, nitrous oxide with high oxygen content is still the anesthetic of choice. For the more difficult or complicated situations requiring prolonged narcosis, where nitrous oxide and oxygen is inadequate, synergists such as ethyl ether, vinyl ether, trichloroethylene, ethyl chloride, ethylene, surital sodium, or pentothal sodium may be used.

The modern anesthesiologist no longer employs heavy doses of any one anesthetic to saturate his patient. Instead he selects minimal doses of various drugs and combines them to produce a balanced anesthesia, utilizing a maximum amount of oxygen in the mixture. This method produces a safe and smooth anesthesia with rapid recovery devoid of post-anesthetic depression, headache, nausea or vomiting.

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Premedicants and narcotic synergists must be utilized sparingly because the dental patient must recover fully from the anesthetic as quickly as possible after its withdrawal, in order to be able to function normally and to leave the office unassisted. Considering all of these factors the dental anesthetist has a relatively different problem than the hospital anesthetist. Dental anesthesia is a specialty in itself.

It is important for the dentist to familiarize himself with the advantages of the newer drugs and to reappraise the older ones with the view of selecting the combinations most suitable to his needs. All drugs in current usage as general anesthetics for oral surgery office practice will now be evaluated.

Ethyl Ether U.S.P.

Ethyl ether is a colorless, highly volatile liquid with an irritating, pungent odor and burning taste. It is highly inflammable and explodes violently. It should not be used in the presence of an open flame or spark.

Ether may be administered by the open drop, semi-closed, and closed inhalation methods. In oral surgery it may be used as a synergist with nitrous oxide-oxygen. Although ether has a potency of 100 per cent, it produces a delayed and unpleasant induction because of its irritating qualities and slow action. It produces anesthesia with 4 per cent concentration and respiratory failure with 8 per cent concentration in the alveoli. It is not suitable for analgesia. Recovery is slow, the agent being eliminated in unaltered form almost completely through the lungs. Nausea and vomiting are much more frequent than with nitrous oxide-oxygen.

Ethyl Chloride U.S.P.

At low temperatures and under pressure, ethyl chloride is a highly volatile, inflammable and colorless liquid with a sweet taste and ethereal odor. It is usually stored under pressure, in glass tubes having a special release mechanism. The heat of the hand on the outside of the container is sufficient to convert the liquid to a gas.

Ethyl chloride can be administered by semi-open and open inhalation methods. For very short dental and oral surgery procedures, the use of the open method is recommended. It can be administered as a local as well as a general anesthetic. When ethyl chloride is sprayed on the tissues, its low boiling point causes immediate evaporation with a rapid withdrawal of heat. The result is a temporary superficial freezing and destroying of peripheral nerve function. As a general anesthetic it produces a rapid and quiet induction, although the cold vapor may be irritating. The anesthetic potency is less than chloroform, equal to ether and greater than nitrous oxide. In 2 to 3 per cent by volume in the alveoli, it produces analgesia; while anesthesia is produced in 5 to 6 per cent concentration in the alveoli.

Recovery is rapid although, being a fat solvent, elimination of the drug is slightly delayed. The majority of the gas is eliminated through the lungs. Nausea and vomiting are rare. The drug is extremely potent and has a narrow margin of safety. It inhibits the conducting mechanism of the heart due to vagal stimulation. It is a strong circulatory depressant and may cause circulatory failure. Cardiac failure occurs before respiratory failure. Ethyl chloride may be employed for short operations on young children and as an induction agent.

Divinyl Oxide-Vinyl Ether U.S.P.

Vinyl ether is a highly volatile, clear, colorless fluid having a distinctive pungent odor. On exposure to light and air it decomposes, losing its anesthetic properties. The drug is inflammable and explosive. It should not be used in the presence of spark emitting apparati.

Vinyl ether may be administered by the open drop, semi-closed and closed inhalation methods. Though induction is rapid, the agent is slightly irritating. It is 100 per cent potent. It produces analgesia with 2 per cent by volume, anesthesia with 4 per cent by volume, and respiratory failure with 8 per cent concentration. Recovery is smooth and rapid, the drug being eliminated in unaltered form, mainly through the lungs. Nausea, vomiting, and post-anesthetic headache are frequent. In oral surgery, the drug may be used as a basal anesthetic or synergist with nitrous oxide-oxygen. The open drop method may be used for short procedures on children.

Ethylene U.S.P.

Ethylene is a colorless gas with a pungent offensive, garlic-like odor and taste. It is highly inflammable and explosive in the presence of oxygen, or nitrous oxide-oxygen in the closed or semi-closed method. Induction is fast, although the odor may be disagreeable to some people. Its potency is 25 per cent. It produces analgesia with 10 to 30 per cent by volume, anesthesia with 50 to 85 per cent by volume, and respiratory failure with 90 to 100 per cent by volume in the alveoli due to lack of oxygenation.

Recovery is rapid, occuring within two to three minutes after cessation of administration. Traces of the agent may be found on the breath two or three days after administration. Considerable nausea often occurs. Overdosage with ethylene is treated with oxygen as easily as is nitrous oxide overdosage.

The dental office is equipped with spark emitting appliances. The highly explosive nature of ethylene precludes its use as an anesthetic agent in office oral surgery.

Trichloroethylene U.S.P. (Trilene or Trimar)

Trichloroethylene is a colorless, highly volatile liquid with a sweet non-irritating odor, which resembles chloroform. It is insoluble in water but mixes with ether and chloroform. It is not explosive under conditions found in office oral surgery and may be used with safety in the presence of spark emitting apparati common in dental offices. It may be administered through an inhaler, directly or through standard anesthetic machines, (without CO_2 absorption), by passing the gaseous vehicle over the trichloroethylene liquid.

It cannot be used successfully for induction of anesthesia by itself but is very satisfactory as an adjunct with nitrous oxide and oxygen for induction and maintenance of anesthesia. It is relatively less volatile than vinyl ether (Vinethene) and therefore less expensive for routine use. Recovery from anesthesia is slower than recovery from anesthesia with vinyl ether or nitrous oxide, and relatively less mucus and saliva are produced.

Trichloroethylene, like chloroform, ethyl chloride or cyclopropane, has a toxic effect on the heart. For this reason, whenever the anesthetist is using trichloroethylene, he should

keep constant and vigilant watch on the pulse of the patient to note any changes in the rhythm or volume.

Pentobarbital Sodium and Secobarbital Sodium U.S.P.

Recently in dental anesthesia the use of pentobarbital sodium (Nembutal) and secobarbital sodium (Seconal) administered intravenously has been more widely accepted. These agents have certain distinct advantages over thiopental sodium or thiamylal sodium. Solutions of these drugs can be purchased and kept in the dental office over long periods of time without deterioration. It appears that there is no increased incidence of laryngeal spasm following the use of pentobarbital sodium or secobarbital sodium administered intravenously. This factor is of distinct value to the dental anesthetist who is usually not prepared for laryngoscopy and intubation.

The disadvantages in the intravenous use of either of these drugs, as compared to the use of thiopental sodium, are that their effect is more prolonged, the recovery from anesthesia is prolonged, and the period of recovery in the dental office is longer. Dosage for induction of anesthesia is 3 cc. to 7cc. (150 mg. to 350 mg.), given intravenously.

Thiamylal Sodium U.S.P. (Surital Sodium)

Thiamylal sodium produces a clear and alkaline aqueous solution. It is supplied in ampules as a dry sodium salt. The solution may remain stable up to 14 days. Administration is by intravenous injection. For induction, 4 to 10 cc. of a 2 to 2½ per cent solution may be injected, followed by fractional doses of 1 to 2 cc. This may be supplemented by nitrous oxide-oxygen.

Induction is smooth and dramatic. Recovery is rapid and is usually without post-anesthetic nausea or other undesirable reactions. The drug is detoxified mainly in the liver. Thiamylal sodium is a respiratory depressant, and respiratory failure occurs before circulatory failure.

The drug may be used alone for short anesthesia, or as a basal anesthetic with nitrous oxide-oxygen. The balanced anesthesia produced by thiamylal sodium, and nitrous oxide-oxygen is desirable for ambulatory surgery and is indicated in prolonged oral surgery.

Thiopental Sodium U.S.P. (Pentothal Sodium)

Thiopental sodium is a yellowish white, hygroscopic powder with a disagreeable odor. It is soluble in water and alcohol. The solutions are alkaline, decompose on standing and precipitate on boiling.

Thiopental sodium has recently come into popularity as an anesthetic agent for oral surgery in the dental office. Its use is attendant with the usual deference accorded any general anesthetic agent and should be administered with precision based upon a thorough knowledge of its limitations and contra-indications.

Patients suffering from heart disease, particularly if they are decompensated, those with respiratory disorders and general debilitating conditions such as severe anemia, marked drop in blood pressure, or following hemorrhage or shock, should have careful medical evaluation before thiopental sodium is given.

There is no contra-indication as to age although extremes in age warrant exceptional care in the use of the drug. It is not ordinarily satisfactory for very young children because of

the problem of cooperation and the difficulty of venipuncture.

Because of its powerful action, preliminary sedation may be omitted. The stomach should be empty, also the bladder and rectum. Blood pressure and pulse rate should be recorded.

Thiopental sodium, like other barbiturates does not reduce pain reflexes, except when used in sufficient doses to depress the central nervous system causing loss of consciousness. Thiopental sodium is given intravenously either by syringe in a 2 per cent solution or by drip in 0.4 per cent solution. For office use the 2 per cent solution given by syringe is the method of choice because weaker solutions require too great a volume of the agent for the ambulatory patient, and stronger solutions may cause tissue necrosis if there is extravenous infiltration. For all methods a sterile technique must be observed.

Injection is usually made into the median basilic, median cephalic or median cubical vein with an inch and a half, 20 gauge needle. If the patient complains of pain when the solution is being injected one may be certain that it is being injected extra-venously and should be discontinued, and another vein selected preferably in the opposite arm. If much of the solution has escaped, infiltration of the area with a 2 per cent novocaine solution should be resorted to. This dilutes the irritating drug and stops pain. Moist heat should then be applied to the part.

Thiopental sodium should be given by rapid injection in fractional doses. The amount of the initial dose is determined by the physical and emotional condition of the patient, the length of the operation and the amount of painful surgical stimuli contemplated. If relaxation and unconsciousness has not appeared following the initial dose of 10 cc. an additional 5 cc. is given. When anesthesia has been established, fractional doses of 2 cc. at a time are indicated to maintain the desired anesthetic level until surgery is completed. Induction is smooth and pleasant, the average interval being 10 to 30 seconds.

The above mentioned dosage is for the purpose of illustration and therefore arbitrary. However a half gram of the drug, which is 25 cc. of a 2 per cent solution would probably be required for the removal of the four unerupted 3rd molars for a 21 year old male.

Euphoria and amnesia precede anesthesia which closely resembles normal sleep and is comparable to first plan surgical anesthesia with inhalant anesthetics.

For open mouth work, such as the removal of teeth, a mouth prop should be inserted at the time of induction so that no difficulty will be experienced in separating the jaws. The pharynx should be lightly packed for the protection of the air-way against foreign matter.

When long procedures are involved, or in patients in whom oxygenation is a critical factor, inhalation of nitrous oxide-oxygen mixtures should be used to supplement the action of thiopental sodium. In this manner the amount of thiopental sodium required is greatly reduced and hypoxia avoided. Amounts exceeding a gram and a half of thiopental sodium are not considered advisable for the ambulatory patient.

Blood pressure usually falls after the initial injection but returns to its previous level quickly. The temperature of the extremities tends to rise several degrees but the skin remains dry.

Early recognition and treatment of changes in respiration during anesthesia such as stridor or crowing will usually prevent the development of laryngospasm. Careful examination of the pharynx and aspiration to remove any mucus or other foreign substances stimulating the cords often suffices. To overcome laryngospasm the administration of oxygen through the nasal inhaler and aspiration with a tonsil tip is usually sufficient to break a mild spasm and relieve hypoxia. If severe laryngospasm or overdose has caused anoxia, a rapid muscle relaxant such as succinylcholine chloride 10 to 20 mgs. injected intravenously, together with oxygen under pressure through the nasal inhaler and aspiration will usually bring about prompt relief.

The action of this relaxant persists approximately three to four minutes until the return of normal respiration, during which time artificial respiration must be carried on for the patient. This procedure requires a well trained operating team of at least three. Laryngospasm is not dangerous or alarming if treated properly and promptly.

Consciousness is usually regained in from ten to fifteen minutes following the administration of an average dose of thiopental sodium. The patient generally can be aroused to speak coherently at that time; he will however, be sleepy and remain quiet for several hours if undisturbed. Hot coffee stimulates recovery. Detoxification of the drug and removal of it from the blood stream is at the rate of 15 per cent per hour. Vomiting, headache or other distressing symptoms are rarely observed.

It is desirable, but not absolutely essential for patients to be accompanied home.

Neraval (Methitural Sodium)

Neraval sodium belongs to the group of ultra short-acting barbiturates and is the salt of methyl-thioethyl-pentyl-thio barbituric acid.

Neraval crystals have a faint yellow tinge and dissolve slowly in distilled water to form a solution which has a strong sulfurous odor. It is freshly prepared in aqueous solutions of 2½ to 5 per cent concentrations but like other sodium thiobarbiturates loses its potency rather rapidly.

Neraval is used in a manner similar to thiopental and thiamylal, that is, intermittent intravenous injections of 2½ per cent aqueous solutions, supplemented with N_2O and O_2 (50-50 mixtures).

This drug is contraindicated for any patient for whom other barbiturates are contraindicated for general anesthesia.

Nitrous Oxide U.S.P.

Nitrous oxide is an inorganic gas which has a pleasant odor and a sweet taste; is non-irritating, non-explosive, non-inflammable but supports combustion, and when inhaled forms no combination with the body tissues. It is highly soluble in the blood plasma but does not combine with the hemoglobin.

In prolonged use it neither interferes with nor alters body functions. As it is only held in loose physiological solution in the body, the gas is almost completely eliminated by the lungs within a few minutes after it is withdrawn. Its action is also quickly reversible by the addition of sufficient oxygen under pressure to wash it out.

Nitrous oxide produces analgesia with 20 to 50 per cent by volume, and anesthesia with 50 to 80 per

cent by volume in the alveoli. Respiratory failure is produced by 90 to 100 per cent by volume in the alveoli, after prolonged and severe hypoxia.

Clinical experience has universally selected nitrous oxide and oxygen as the anesthetic of choice for short oral surgical procedures because it conforms more closely to the qualifications of an ideal anesthetic than any of the other drugs. It is pleasant to take, produces a light safe plane of anesthesia with rapid recovery and a minimum of post anesthetic sequelae.

Nitrous oxide is administered by inhalation under positive pressure, using a semi-open or closed method. A slow or fast induction technic may be used. In the rapid induction method the patient is given nitrous oxide until the first signs of the surgical plane appear. These are; change in breathing, loss of lid or lash reflex, or eccentric fixation of the eyeball. Oxygen is then rapidly added until the maximum toleration point is reached. This of course varies with the individual patient. The oxygen percentage has to be reduced or increased until the proper level for smooth maintenance of surgical anesthesia is attained.

As a general rule, aged, anemic and debilitated patients require higher oxygen percentages, whereas the overstimulated types do well on lower oxygen percentages in anesthesias of short duration. Nitrous oxide should never be forced beyond the limits of safety, based upon our knowledge of its properties and effects. In order to eliminate the danger of secondary saturation while subduing or leveling the resistant or the obstreperous patient, a synergist in the form of a more potent anesthetic should be added. Trichloroethylene together with nitrous oxide and oxygen produces smooth anesthesia with a greater margin of safety by permitting higher oxygen concentration.

There is no necessity for anoxia to occur or prolonged hypoxia to persist when anesthesia is correctly administered. Such situations may cause irreparable damage to the brain.

When surgical procedures of longer duration than the removal of a few teeth are contemplated, the alcoholic addict or obstreperous patient should be premedicated 5 minutes before general anesthesia is instituted. Pentobarbital sodium 1½ to 3 grs. by vein is highly satisfactory for this purpose because of its low toxicity, rapid action and short duration.

Patients afflicted with severe myocardial ailments should be properly digitalized by their cardiologist whose consent is best obtained before a general anesthetic is given.

In conclusion I would like to emphasize that general anesthesia is always a major procedure no matter how minor the surgery, and should merit the highest skill and proficiency of technic in its administration.

* * *

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Anesthesia and the Tracheobronchial Tree

Robert P. McBurney, M.D., F.A.C.S.*

Because I have been an anesthetist, I am familiar with some of the problems which the anesthetist faces. During the war, I worked almost 2 years in anesthesia, and although I am now practicing surgery, I still maintain an interest in anesthesia and feel a bond with those actively doing anesthesia.

A year or so ago a smart young New York advertising man hit on the word "togetherness" to describe the family of today. The family lives together, works together, plays, and prays together. McCall's Magazine has made this their theme for the present times.

Togetherness, I feel, also describes well the relation of anesthetist to surgeon and to all working in the operating room. They are not there to each demonstrate his or her own proficiency or to look good, to hit the trachea with the first thrust of the tube, to flash through an appendectomy in 10 minutes, or the like. The anesthetist and surgeon are there together, to work together to see that the patient is safe at all times, to see that anesthesia is carried out without pain or injury to the patient, and without postoperative complications. The surgeon and anesthetist cooperate to see that each has ideal conditions to do his or her work properly. The surgeon's job is not only to operate on the patient and remove organs or the like, but his job begins at the time the patient is first seen, and his responsibility never ceases until the patient is dismissed. This means that when the surgeon first sees the patient and decides to operate, he should also consider at that time what type of anesthesia the patient should have. If he has questions in mind regarding this, then he should consult with his anesthetist ahead of time and not just the minute before the needle goes into the vein.

Togetherness also means the surgeon should apprise the anesthetist of problems that may be expected in any particular case. For example, if the patient is allergic to any particular drug, the anesthetist should be aware of it. Also, if the patient is an alcoholic or has a poor heart, or is frightened or severly ill, all of these things should be made known to the anesthetist and such problems discussed before, rather than after induction begins.

Togetherness means that the surgeon should be at hand, willing to help the anesthetist even in small ways if needed. A difficult venipuncture may be the chance for the surgeon to lend a hand, even such a

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small thing as handing the adhesive tape or holding the chin for a minute. These things help the anesthetist and are appreciated when needed. Sometimes the surgeon may be called on to intubate the patient, and in my opinion, no surgeon coming out of training in these times should consider himself trained unless he is familiar with and skilled at intubation and bronchoscopy.

The anesthetist, in turn, should do everything possible to assure the surgeon of a patient with a relaxed abdomen or quiet chest, but these things are not to be achieved at the expense of the safety of the patient. The surgeon should not hurry or pressure the anesthetist in any way. Sometimes a reassuring word to the anesthetist is the best medicine for the patient.

Most anesthesia now is given through the veins or via the tracheobronchial tree. Since a discussion of intravenous anesthesia would lead one inevitably to a discussion, mainly of the effect of drugs on the brain, and is such a broad topic, I have chosen to discuss the tracheobronchial tree, and hope that by doing this, as surgeon to anesthetist, I may contribute to the togetherness of our relationship.

Anatomy and Physiology

The entrance and exit of the tracheobronchial tree is the larynx, and this highly specialized organ is one which has caused many a headache and bead of sweat to the anesthetist. Its framework is nine cartilages bound together by membranes and muscle, and these same cartilages are the attachments for muscles which control the movement of the vocal cords. The vocal cords are tough ligamentous structures attached in front to the angle of the thyroid cartilage and behind to the arytenoid cartilages.

Muscles of the larynx are those extrinsic ones which pass from the larynx to adjoining parts and intrinsic ones which are confined to the larynx and have to do with opening and closing of the glottis. The main intrinsic ones are the crico-arytenoid posterior which opens the glottis by rotating the arytenoid cartilages, the crico-arytenoid lateral which rotates the cartilage inward and closes the glottis, and the arytenoid muscles which further close the glottis. Other muscles of the larynx have more to do with phonation, pitch, etc.

The mucous membrane is primarily stratified squamous epithelium but is columnar ciliated in the lower part. Numerous mucous secreting glands are present. The nerve supply is vagus and sympathetic, the former being the dominant.

The trachea is a cartilagenous and membranous tube extending from the lower border of the larynx to the bifurcation and is about 11 centimeters or 5 inches in length and about 1 inch in diameter. It divides into a right and left main bronchus with further subdivisions. Its cartilagenous rings are incomplete with rings in front and membrane behind. It has no named muscles, but muscle and elastic fibers are present in its wall and help to maintain elasticity and motion of it. Again, the lining is ciliated, stratified columnar epithelium, and the nerve supply is vagal and sympathetic.

The larynx not only is the apparatus of voice and phonation, but its even more basic fuction is the protection of the trachea, bronchi, and

lungs from foreign material. That the glottis is closed tight during the swallowing mechanism is well known. The presence of any stimulation in the pharnyx or larynx will close the glottis in the unanesthetized or lightly anesthetized individual. This stimulus is mediated via the vagus nerve. These facts make it obvious that there must be paralysis or anesthesia of the laryngeal muscles in order for successful intubation to be carried out.

Vagal-like drugs, such as Pilocarpine or Mecholyl, will cause constriction of the bronchi and trachea, and tend to cause laryngospasm. The same may be said for histamine and foreign proteins. Adrenalin and ephedrine have the opposite effect, and vagal blocking drugs such as atropine, Banthine, and the like tend to prevent spasm and to relax bronchi. Antihistamines will produce relaxation in bronchospasm which is on an allergic basis.

It is obviously important that the patient receive adequate atropine or similar drugs prior to induction of anesthesia, and that any possible drug allergy be known to all.

Pentothal is thought to sensitize the larynx to spasm. It is probably more likely that most cases of laryngospasm that arise with Pentothal are due to the injudicious insertion of airways while the patient is only lightly anesthetized.

Endotracheal anesthesia has been a wonderful advance in anesthesia; however, it can be a two-edged sword if improperly used. Its advantages are that it insures freedom of airway and prevention of aspiration. It enables one to control intrapulmonic pressure, and thus prevents pneumothorax in the open chest, and it enables one to control and furnish artificial ventilation.

Its disadvantages are that in the unpractised hand, it may lead to trauma of the larynx and laryngospasm, and it may lead to a false sense of security regarding the airway. Also, the use of paralytic drugs to enable one to carry out intubation has led to death in some cases in which intubation was not successful and ventilation was not adequate during the time that the intubation was being attempted. Also, another source of accident is the insertion of the tube into the esophagus with ventilation of the esophagus and not of the lungs.

When the tube is correctly inserted, then the anesthetist must guard against kinking of the tube by angulation, or by the surgeon or assistants leaning on it, as in head and neck surgery. Also, the patient must be prevented from biting the tube when anesthesia is lightened, and such accidents as separation of the angle piece or dislodgement of the tube with it going into the right main bronchus or slipping out entirely, are to be guarded against. These accidents may happen, they have happened, and they can lead to fatalities.

With a tube in place, it is possible for the anesthetist to keep the tracheobronchial tree clear of mucus, blood, or vomitus. The tracheobronchial tree must be kept clear of these or aspiration pneumonia or atelectasis will invariably follow.

Other complications of intubation are cough, breath holding, and anoxia, particularly when intubation is done under light anesthesia. Occasional arrhythimas of the heart occur with intubation or extubation, but it is more likely that they are due to coincident anoxia than to the stimulation of the vagus. Cardiac arrest has been known to occur at the time of intubation and also at extubation

and bronchoscopy. This may be vagal in origin, and one should be constantly aware of its possibility.

Most of the late sequelae of endotracheal anesthesia are due to trauma, to lack of skill in intubation, or to failure to keep the tracheobronchial tree clear. These troubles may be pharyngitis, tracheitis, rhinitis, damage to teeth, nose, pharynx, and larynx, acute edema of glottis (particularly in children), granuloma of larynx, and hoarseness. Pneumonia, atelectasis, empyema, or lung abscess may follow failure to keep the trachea and bronchi clear.

It is obvious from the above that endotracheal anesthesia is only to be used in selected cases. It is ridiculous to insert a tube on cases such as appendectomy, inguinal hernia, surgery of the extremities, rectal surgery in the supine position, or mastectomy, and the like. Yet, some anesthetists will use a tube merely because they do not want to bother holding up the chin. Such a practice is to be condemned.

Head and neck surgery usually requires endotracheal anesthesia as does all intrathoracic surgery. Some cases of upper abdominal surgery can be done without endotracheal anesthesia, but in general, in stomach, gallbladder, liver, spleen, and diaphragmatic surgery, endotracheal technics are best.

In closing, I would like to mention a few things I have seen during the past fourteen years that I have been working in surgery and anesthesia, both in training and in practice—things which might be labeled sins of omission and commission. With these I would like to pass on to you some suggestions which might be of help. I mention these as constructive criticisms only, and not in any way do I intend to be critical of nurse anesthetists.

1. Many nurse anesthetists do not have enough familiarity with the anatomy of the larynx or enough experience with intubation. This knowledge can only be gained by study, review, and practice, practice, practice. If one is dissatisfied with her own technic, then she should observe others, study the texts, and if she is in a medical school town, she can go to the surgical laboratory and practice on the dog. There is no easy way to become skilled with intubation.

2. I have sometimes seen the anesthetist come to the operating room with only one endotracheal tube, a tube picked out without even knowing what size individual she has to intubate. This leads to a "make it do" situation. The anesthetist should have a selection, in the operating room, of at least 3 or more tubes of varying sizes. In this same vein, there should always be a second laryngoscope in the operating room. Nothing is more exasperating to the anesthetist and surgeon too than to have everything ready for intubation and have the laryngoscope light blow out with no replacement handy.

3. Before starting the anesthesia, all scopes and tubes should be checked. One should look down the lumen of the tube to check its patency before inserting it. Obviously, all tubes should be surgically clean.

4. Intubation in people with short necks and large teeth will be difficult for experts, and in such cases, the anesthetist should have a helper present to hand her the tube or press on the larynx or give more medication if necessary.

5. Do not be ashamed to admit that you cannot get the tube in, and do not hesitate to call for help. I have seen 5 and 6 attempts at intubation with consequent trauma to the mouth, teeth, larynx, and pharynx, before the anesthetist calls for help. A good rule to follow is that after two attempts if one is unable to intubate, then more experienced help should be called or anesthesia done without the tube. It is embarrassing later to have to explain to the patien. why her lip is swollen, a tooth chipped, her throat sore, or her voice hoarse.

6. Consult with the surgeon more. Ask if any special considerations are present; ask if endotracheal anesthesia is desired. He might be perfectly happy to operate without it or might want such a technic when the anesthetist failed to plan for it. Most surgeons will have more confidence in the anesthetist who talks over the problems of each case.

7. I personally believe that the so called "crash induction and intubation" is dangerous and more apt to lead to trauma. I refer to the practice of giving a little Pentothal, then Curare and immediate intubation. With this method, the patient is not anesthetized but is just asleep and paralyzed. In my opinion, another five minutes spent with induction and the use of cocaine or Pontocaine to spray the cords is a safer method because I feel there is less danger of laryngospasm with this method and that the patient continues to breathe during the intubation, which he does not do with the crash intubation technic. Speaking as a surgeon, I am never in such a hurry that I cannot wait 10 minutes or longer in order to have a safer method of induction and intubation used.

Conclusion

Finally, I hope my brief remarks will stimulate some ideas, and that continued work and study by all of us, surgeons and anesthetists alike, will lead to safer anesthesia and surgery for the most important person in the operating room—the patient.

Neraval in Oral Surgery

Robert M. Booth, D.D.S., F.I.A.A.*
and
Julius Wessel, R.N.*
Springfield, Illinois

Neraval† (Methitural Sodium) is a synthetic, ultra short-acting barbiturate. It seems to be a safe, effective anesthetic agent with a pronounced rapid rate of patient recovery. Solutions are alkaline and decompose on standing at room temperature. However, solutions may be stored for 7-10 days under refrigeration.

INDUCTION

The induction of Neraval is smooth and pleasant with a slightly longer induction time than that experienced with Pentothal Sodium. Varing solution of 2½, 4 and 5% were used preceded by intravenous atropine of grs. 1/150. As with Pentothal, the rapid administration of stronger solutions of Neraval may elicit pain and a burning sensation at the site of injection. Coughing and the incidence of laryngospasm were uncommon. A bite block was omitted permitting the patient to swallow during induction of the anesthetic. Adequate relaxation was obtained even during very light anesthesia to permit the insertion of a bite block or mouth gag as required. While coughing was noted in the early cases the problem was soon overcome with an increase in experience in the administration of the agent.

No fasting was observed prior to anesthesia. Nausea or vomiting were not present during or following anesthesia. The similarity to natural sleep was remarkable with yawning and a pleasant smile during induction. Care was used in the induction of Neraval with the character of the pulse noted at all times. Respiration was the best guide sign. Respiration appeared less depressed than with Pentothal. No case of apnea was observed.

POTENCY

A 4% solution of Neraval compares favorably with the 2% solution of Pentothal in the rate of administration and potency. The depth of anesthesia was about the same as that of Pentothal. Neraval in some cases was used as a basal anesthetic with Nitrous-oxide-oxygen maintenance. One to two cubic centimeters of Neraval was added as needed to maintain the proper depth of anesthesia for Oral Surgery procedures.

The combination of Neraval and Curare seems promising. There is an increase in the degree of relaxation and a decrease in the milligrams of Neraval required. In prolonged surgical procedures the combination of Pentothal, Neraval and Curare in a single mixture may prove advanta-

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†Schering Corporation, Bloomfield, New Jersey.

geous and deserves experimental investigation.

Cardio-Vascular Changes

The question has often been raised in regard to a possible increase in the bleeding time following a Pentothal anesthetic. With Neraval no prolonged post-operative bleeding was observed. There were no significant changes in respiration, blood pressure or pulse rate.

Post-Operative Recovery

Immediately following a Neraval anesthetic some patients appeared to be deep and would require a prolonged recovery period. However, within 3 to 10 minutes the patient suddenly responded and was awake and coherent. There was an absence of delirium and dizziness. Oral Surgery patients were ambulatory within 30 to 45 minutes following surgery.

Summary and Conclusion

1. This generalized report on the observations of Neraval is not intended as a controlled scientific investigation.
2. The smooth induction and rapid recovery provides a decided advantage for ambulatory Oral Surgery patients.
3. There is an increased degree of analgesia permitting surgery to be performed under light anesthesia.
4. Post-anesthetic nausea, dizziness and delirium are at a minimum

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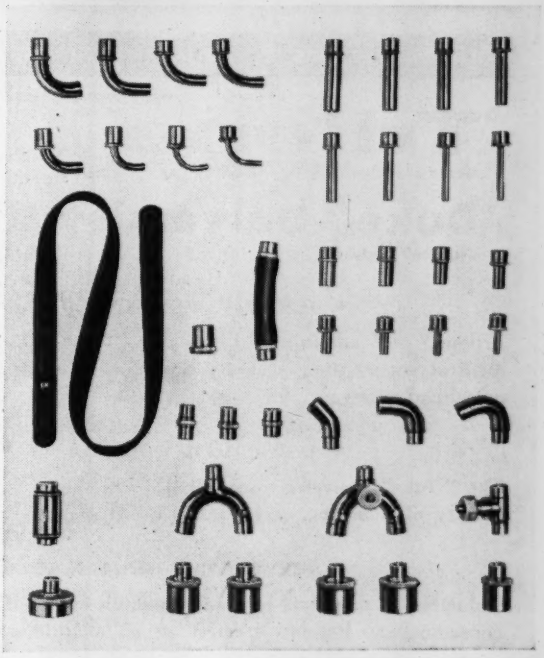

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Evelyn E. Auld (Watts Hospital, Durham, N. C.): Graduate of Johns Hopkins Hospital School of Nursing, Baltimore; graduate of the Duke University Hospital School of Anesthesia, Durham, N. C.; member of A.A.N.A. in good standing since 1942; Chief Anesthetist and Director of the School of Anesthesia at Watts Hospital 1948-56; member of Examination, Education and Advisory to Approval of Schools Committees, A.A.-N.A.; member, Board of Trustees, A.A.N.A., 1954-56; 2nd vice president, A.A.N.A., 1956-57.

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Marie W. McLaughlin (Ingalls Memorial Hospital, Harvey, Ill.): Graduate of St. Luke's Hospital Nurse's Training School, St. Paul, Minn.; graduate of St. Luke's Hospital School of Anesthesia, St. Paul; member of the A.A.N.A. in good standing since 1933; secretary-treasurer, Tri-State Nurse Anesthetists Assembly, 1953-54; chairman of Convention Committee, A.A.N.A., 1953-54; member of Bylaws Committee, A.A.N.A., 1954-55; Treasurer, A.A.N.A., 1955-57.

Irene E. Hoge (Sheltering Arms Hospital, Richmond, Virginia): Graduate of Highsmith Hospital School of Nursing, Fayetteville, North Carolina; graduate of Duke University Hospital School of Anesthesia; member of A.A.N.A. in good standing since 1942; Chairman, By-Laws Committee, Carolinas-Virginias Assembly of Nurse Anesthetists, 1954-55; Chairman, Program Committee, Virginia Association of Nurse Anesthetists, 1955-57; President, Carolinas-Virginias Assembly, 1955-57.

TRUSTEES REGION I

Marie A. Bader (Martland Medical Center, Newark, N. J.): Graduate of All Souls Hospital School of Nursing, Morristown, N. J.; graduate of Mary Immaculate Hospital School of Anesthesia, Jamaica, L. I., N. Y.; member of A.A.N.A. in good standing since 1941; former president New Jersey Association; Trustee, A.A.N.A., 1953-55; member Public Relations Committee, A.A.N.A., 1956-57; Secretary-Treasurer Middle Atlantic Assembly of Nurse Anesthetists, 1957-58.

Elizabeth M. Boyer (Veterans Administration Hospital, Cleveland, Ohio): Graduate of Youngstown Hospital School of Nursing, Youngstown, Ohio; graduate of Jackson Park Hospital School of Anesthesia, Chicago, Illinois; member of A.A.N.A. in good standing since 1934; former President and Secretary-Treasurer, Ohio Association of Nurse Anesthetists; has served on Program and Nominating Committees, A.A.N.A.

Ruth P. Satterfield (Maj. ANC, Educational Director School of Anesthesia, Walter Reed Army Hospital, Washington, D. C.): Graduate of Georgetown University School of Nursing, Washington, D. C.; graduate of University Hospital School of Anesthesia, Cleveland, Ohio; member of A.A.N.A. in good standing since 1941; member of A.A.N.A. Examination Committee, 1949-53; B.S. in Nursing Education, University of Rochester, Rochester, N. Y.; M.S. in Nursing Education, Teachers College, Columbia University, New York.

TRUSTEES REGION 4

Jennie Cross (St. Luke's Hospital, Fargo, North Dakota); Graduate of Abbot Hospital School of Nursing, Minneapolis, Minnesota; graduate of Barnes Hospital School of Anesthesia, St. Louis, Missouri; member of A.A.-N.A. in good standing since 1942; former President, North Dakota Association of Nurse Anesthetists; Chairman, Upper Mid-West Assembly of Nurse Anesthetists, 1954-56; Chairman, Credentials Committee, A.A.N.A., 1955-57.

Dean Eberhardt Hayden (Barnes Hospital, St. Louis, Missouri): Graduate of Missouri Baptist Hospital School of Nursing, St. Louis; Graduate of Barnes Hospital School of Anesthesia; member of A.A.N.A. in good standing since 1940; Director, School of Anesthesia, Barnes Hospital, 1952-57; former President and Vice President of the Missouri Association of Nurse Anesthetists.

Arline J. Sandwick (Minneapolis General Hospital, Minneapolis, Minnesota): Graduate of Eitel Hospital School of Nursing, Minneapolis; graduate of University of Minnesota Hospitals and Minneapolis General Hospital School of Anesthesia; member of A.A.N.A. in good standing since 1943; former Vice-President and Treasurer, Minnesota Association of Nurse Anesthetists; has served as a member of various committees, Minnesota Association and Upper Mid-West Assembly.

TRUSTEES REGION 5

Ursula Heitmeyer (Oakland, Calif.); Graduate of Providence Hospital School of Nursing, Seattle, Wash.; graduate of Barnes Hospital School of Anesthesia, St. Louis; Secretary of the California Association of Nurse Anesthetists 1948-50; President of the California Association of Nurse Anesthetists, 1953-55; Chairman, Western States Section of Nurse Anesthetists, 1957.

Catherine F. Ingraham (Mercy Hospital, Denver, Colo.): Graduate of Mercy Hospital School of Nursing, Chicago, Ill.; graduate of Grace Hospital School of Anesthesia, Detroit, Mich.; member of A.A.N.A. in good standing since 1950; president, Colorado Association of Nurse Anesthetists, 1952-53; chairman of Publications Committee, A.A.N.A., 1954-55; member Board of Trustees, A.A.N.A., 1956-57.

Sophie Babula (Tucson, Arizona): Graduate of Mercy Central School of Nursing, Grand Rapids, Michigan; graduate of Barnes Hospital School of Anesthesia, St. Louis, Missouri; member of A.A.N.A. in good standing since 1951; Treasurer of the Arizona Association of Nurse Anesthetists, 1956-57.

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7. Have you been advised to have a surgical operation which has not been performed? If so, when and for what?

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	56-60	16.50	31.35	59.40
	61-65	19.80	37.60	71.30
( ) **PLAN B** $150 MONTHLY BENEFIT	16-55	19.80	37.60	71.30
	56-60	24.75	47.00	89.10
	61-65	29.75	56.45	107.15
( ) **PLAN C** $200 MONTHLY BENEFIT	16-55	26.40	50.20	95.00
	56-60	33.00	62.70	118.80
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Members earning $3,000 or more may enroll in Plans A, B or C.

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Ages 16-55	$5.55	$10.55	$19.50
Ages 56-60	6.95	13.20	25.05
Ages 61-65	8.30	15.80	29.90

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Abstracts

BRIGGS, B. D., SHELDON, D. B. AND BEECHER, H. K.: Cardiac arrest. Study of a thirty-year period of operating room deaths at Massachusetts General Hospital, 1925-1954. J.A.M.A. 160:1439-1444 (April 28) 1956.

"In recent years there has been an apparent increase in the incidence of cardiac arrest. The purpose of this study is to determine as accurately as possible, after the fact, whether this increase is absolute or only relative and to find as many of the common causative factors related to cardiac arrest as we can. The data for this study were collected by analyzing and classifying the clinical records of all patients who died in the operating room and of all patients who have been given diagnoses of cardiac arrest during the 30-year interval from 1925 to 1954. For the first 20 years of this period only those surgical services having complete statistical records were included in this study. In the last 10 years all cases are fully documented. Neurosurgical cases, however, have not been included because of the relationship of the operative procedures experienced to the vital centers. Arrests during cardiac surgery also have been excluded unless they led to death. In this event they are included in the tabulation of total operating room deaths. This study covers 189,815 anesthetic and surgical procedures . . . The relative incidence of cardiac arrests and operating room deaths is roughly parallel until the last five years, when more cardiac arrests occur than operating room deaths. This reflects the successful treatment of this emergency to the point where, during the last five years, 50% of these patients have completely recovered. The total incidence of operating room deaths for the 30-year period is 1:1,091; of cardiac arrests (including cases of recovery or delayed death), 1:1,406 . . . .

"Cardiac arrest is the major cause of operating room deaths, and there has been an absolute increase in the incidence of this emergency in recent years. This recorded increase is due to the current awareness of the problem, leading to an increased frequency in its diagnosis, and the increased number of surgical procedures carried out in elderly and decrepit patients. Cardiac arrest has been shown to be more common in old patients (twentyfold), in poor risk patients (thirtyfold), and in patients with heart disease (fivehold) than in others. Additional contributory factors are deepening anesthesia, hypoxia, reflex phenomena, and improper choice or management of anesthesia. During the last 10 years the recovery rate in cardiac arrest was 37%, and during the last 5 years the recovery rate was 50%."

BUTLER, J., AND SMITH, B. H.: Pressure-volume relationships of the chest in the completely relaxed anaesthetized patient. Clin. Sc. **16:** 125-146 (Feb.) 1957.

"The opportunity for studying the pressure-volume characteristics of the human respiratory system in the ab-

sence of muscular modification has arisen with the introduction of anaesthetic techniques which commonly employ curarising agents to produce muscular relaxation. The 'elastic' or static pressures resulting from a volume change, are measured in terms of the compliance of the system, which is the volume change in litres corresponding to a 1 cm. H_2O pressure variation .... This investigation is an attempt to evaluate the total respiratory compliance in the anaesthetised, completely relaxed subject, and to assess the pulmonary and chest wall compliances alone so that the influence of each on the total compliance could be determined ....

"Measurements of total respiratory compliance and lung compliance were made in a group of forty-four anaesthetised and completely relaxed patients. Chest wall compliance was assessed by the difference between these values ....

"The effects on the pressure-volume relationships of stepwise inflation, using different volume increments, continuous inflation, and repeated inflations, have been assessed. Comparison between patients of different age and size was aided by the calculation of distension pressure which is the static pressure in cm. H_2O for an increase of 10% in predicted total lung capacity. The total respiratory compliance was decreased in the anaesthetised and relaxed patient when compared with reported values in the conscious, voluntarily relaxed subject. The total respiratory pressure volume relationships in these patients was non-linear during stepwise chest inflation, the pressure increment for equal additions of gas decreasing as the chest volume increased. The mean total compliance value for 41 patients over the 0-2 1. range was 0.098 1./cm. H_2O.

"The decrease of total respiratory compliance was due to decreased lung compliance. Chest wall compliance appeared to be normal, the mean compliance being 0.268 over 0-2 litres in 30 anaesthetised and relaxed patients. The chest wall became much more compliant as the volume increased to 2 litres. Lung compliance in 33 patients averaged 0.153 1./cm. H_2O over the 0-2 1. range, which is less than reported mean values in conscious patients. Different volume increments did not affect the compliance. More rapid continuous inflation led to a reduced compliance value. Second inflations performed after deflation following the initial chest distension or after a ventilation period of less than two minutes gave the same pressure-volume curve as the initial chest distension. The decreased pulmonary compliance may be due to a reduction in effective alveolar volume due to the abnormal respiratory mechanics under these conditions."

GODDARD, R. F., AND ROORBACH, ELIZABETH H.: Intermittent positive-pressure breathing-aerosol therapy for asthma in children, J.A.M.A. **163:** 1125-1130 (March 30) 1957.

"Recent studies in intermittent positive-pressure breathing — aerosol therapy in children indicate that such therapy has been more effective in treatment of asthma in children than in adults by not only arresting the progress of the disease but also reversing the chronic changes due to edema, bronchospasm, and emphysema and promoting the restoration of normal pulmonary compliance and elasticity .... One hundred children, ranging in age from 1 to 17 years and suffering from varying degrees of asthma, have been treated by intermittent positive-pressure breathing—aerosol therapy during the past four

years [at the Lovelace Clinic, Albuquerque, New Mexico] . . . . .

"In our series, 98% of children with asthma of varying degrees responded to intermittent positive-pressure breathing-aerosol therapy . . . Evaluation of the improvement was based on subjective symptomatic and physical changes and objective routine laboratory and specific pulmonary function studies. Forty of the children had failed to respond to the usual methods of therapy, which were adequate for another 105 children with less severe asthma. In our experience, therefore, we believe intermittent positive-pressure breathing-aerosol therapy for treatment of asthma in children has proved to be an adjunctive, 'curative,' and prophylactic type of treatment."

WYANT, G. M.: Respiratory obstruction due to blood clot from bleeding bronchiectasis: a case report. Canad. Anaesth. Soc. J. **3: 276-278** (July) 1956.

"Mrs. G. F., a white female, aged 25 years . . . was admitted to University Hospital [Saskatoon] on December 24, 1955, because of haemoptysis . . . . Operation was started 20 minutes after induction of anaesthesia. There was at that time no evidence of moist sounds in the tracheobronchial tree. The pleura was opened approximately 10 minutes after skin incision and 10 minutes later, during exploration, some few moist sounds were noted and repeated tracheobronchial toilet was carried out. One hour and fifteen minutes after induction of anaesthesia, tracheobronchial toilet revealed the presence of a little blood, but this did not seem to be excessive and was aspirated. However, 10 minutes later sudden almost complete respiratory obstruction occurred which lasted for close to 10 minutes during which time the pulse rate fell to about 60 and there was increasing cyanosis which eventually merged into a degree of pallor. Patency of the endotracheal tube having been ascertained and mechanical defects in the machine having been rapidly excluded as possible causes, repeated tracheobronchial toilet was vigorously continued and eventually it became possible to re-inflate the exposed upper left lobe; this was followed by some improvement in the patient's condition. It was suspected at that time that ventilation of the right lung was probably poor or absent, judging by the resistance in the breathing bag. By that time the pulse rate had risen to between 130 and 140; the blood pressure had remained pretty well stable throughout the episode of difficulty and thereafter. Tracheobronchial toilet was continued repeatedly while arrangements were made for bronchoscopy, but before they were completed the suction catheter was made to enter the right main stem bronchus and on its withdrawal a long clot, measuring approximately 5 inches, was removed. This clot did not seem to be new in its entirety but there was suspicion of some organization of at least part of it, with fresh clot surrounding it. Soon after removal of the clot, the patient's colour improved markedly and within half an hour her pulse rate had subsided to somewhere in the neighbourhood of 110, where it remained throughout . . . . The postoperative course was quite smooth on breathing exercises and postural drainage . . . . This case is reported in order to emphasize the need for protecting the opposite lung in all 'wet' cases, whether due to bronchiectasis, lung abscess, or bleeding, by such devices as a double lumen catheter, endobronchial blockers, or unilateral bronchial intubation."

Book Reviews

TECHNIQUES AND PROCEDURES OF ANESTHESIA. By John Adriani, M.D., Director, Department of Anesthesiology, Charity Hospital; Professor of Surgery, School of Medicine, Tulane University of Louisiana, and Clinical Professor of Surgery and Pharmacology, School of Medicine, Louisiana State University, New Orleans, Louisiana. Cloth. 568 Pages, illustrated. Charles C Thomas, Publisher, Springfield, Illinois. 1956. $8.75. 2nd ed.

Thoroughly revised and enlarged, this interesting text will be of value to anesthetists prepared for teaching in a large anesthesia department. The material has been compressed into an outline that lends itself to ready reference. The practicing anesthetist and the instructor in the schools of anesthesia will find this invaluable. Drugs that have recently come into use are included in this volume; a few of the older methods and agents have been eliminated. Not only does the author tell how, but also includes thorough outlining of the why for certain procedures.

SURGERY FOR NURSES. By James Moroney, M.B., Ch.B., F.R.C.S. (Eng.); L.R.C.P. (Long.); Visiting Consultant Surgeon, Clatterbridge General Hospital, Cheshire, and Broadgreen Hospital, Liverpool; Examiner in Surgery to the General Nursing Council for England and Wales; Formerly Hunterlan Professor, Royal College of Surgeons of England; House Surgeon and Surgical Registrar and Tutor, Liverpool Royal Infirmary. Cloth. 696 pages, illustrated. Williams & Wilkins Co., Baltimore, Maryland, 1955. $6.00. 3d ed.

This textbook written for nurses by physicians and surgeons contains much of value to the anesthetist. All of the chapters are well worth reviewing. However, the chapter on pre- and postoperative care of the patient which includes the subject of anesthesia will be of immediate interest to anesthetists. The chapters on hemorrhage and shock, as well as many of the chapters on the specific problems of surgery will be found of interest and value. The book is well indexed.

SHOULD THE PATIENT KNOW THE TRUTH? A Response of Physicians, Nurses, Clergymen, Lawyers. By Samuel Standard, M.D., Associate Professor of Clinical Surgery, New York University College of Medicine; Attending Surgeon, Bellevue Hospital and University Hospital; Director of Surgery, Sydenham Hospital, New York, and Helmuth Nathan, M.D., Assistant Professor of Surgery, Albert Einstein College of Medicine, New York; Visiting Surgeon, Bronx Municipal Medical Center. Springer Publishing Company, Inc., 44 East 23rd Street, New York 10, New York. $3.00, Hard Cover; $2.00 Soft Cover.

For all persons who work with patients who have serious illnesses, the question of whether or not they should be told the truth will inevitably arise. In an effort to explore the reasons for telling or withholding the facts, the authors obtained the opinions of nurses, psychiatrists, surgeons, clergymen and others. Discussion of the moral and ethical issues, religious beliefs, legal considerations and underlying philosophies are presented by the various contributors to this most valuable book. Nurse anesthetists who almost daily deal with pa-

tients and their families who may be confronted with the problem of serious illness will profit greatly from reading this volume.

HANDBOOK OF CHEST SURGERY FOR NURSES. By J. L. Collis, M.D., B.Sc., F.R.C.S.; Surgeon, United Birmingham Hospitals; Thoracic Surgeon, Surgical Unit, King Edward VII Memorial Chest Hospital, Warwick; Dudley Road Hospital, Birmingham; Knightwick Sanatorium, Worcester; Conventry and Warwickshire Hospital; St. Wulstan's Hospital, Malvern; Hunterian Professor, Royal College of Surgeons 1944; Late Lt.-Col. R.A.M.C., and L. E. Mabbit, S.R.N., Surgical Ward Sister, Brompton Hospital, London. Cloth. 196 Pages, illustrated. Williams and Wilkins Co., Baltimore 2, Maryland. $3.75.

For the special type of anesthesia necessary for thoracic surgery, the nurse anesthetist is required to know not only the technics of anesthesia for these surgical procedures, but must also be thoroughly familiar with the physiology and mechanics involved, the preparation of the patient and the postoperative care. This 4th edition brings up to date the information nurses should know about these phases of patient care. Especially valuable will be the chapters on pre- and postoperative care. One chapter on anesthesia briefly, but adequately, covers the anesthetic procedures that are used in England, most of which do not vary greatly from those practiced in this country. The surgical considerations are restricted to those involving the chest wall, pleura, lung and mediastinum; cardiac surgery is not included in this volume.

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WANTED: Nurse Anesthetists for 193-bed modern hospital located in a pleasant Mid-western college city of 40,000. 3 weeks vacation and 10 days sick leave per year plus other liberal personnel policies. Salary open. Write: Personnel Office, Blessing Hospital, Quincy, Illinois.

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NURSE ANESTHETIST: Immediate opening in fully accredited, ultra-modern, 100-bed GM&S Veterans Administration Hospital. Salary starting from $4025 to $6390 dependeing upon qualifications. 30 days paid vacation, sick leave, Federal Retirement, and other benefits. Inquire of: Manager, VA Hospital, Miles City, Montana.

NURSE ANESTHETIST for 236-bed general hospital, 30 miles from New York City. Write, stating age, training and experience. Morristown Memorial Hospital, Morristown, New Jersey.

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NURSE ANESTHETISTS: University Hospital. Anesthesiologists and Nurse Anesthetists. All types of anesthesia and surgery. Salary from $4,420. Grace-New Haven Community Hospital, Division of Yale-New Haven Medical Center. Apply: A. J. Gillies, M.D., 789 Howard Avenue, New Haven, Connecticut.

REGISTERED NURSE ANESTHETISTS: Immediate opening for vacation relief with possibility of permanent employment. $460 per month. 650-bed hospital. Exceptional opportunity in active operating room suite. Apply: Personnel Director, Harper Hospital, Detroit 1, Michigan.

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NURSE ANESTHETIST. For 275-bed university affiliated teaching hospital located Chicago near north side on lake front campus of Northwestern University. Starting salary $420 month, 3 weeks paid vacation and 50% tuition reduction on course at the University. Modern, attractively furnished 1½ to 3½ room apartments rented at cost for single or married personnel. Most progressive benefit program in the field. Apply Personnel Relations Department, Passavant Memorial Hospital, 303 East Superior Street, Chicago 11, Illinois.

WANTED: Nurse Anesthetist to complete staff of five. College city, 60,000 population, oil center, modern hospital, approximately 500 beds, new operating room suite, rotate surgery call every 5th night and 5th week end; no O.B. call; room and board available. Contact: O. P. Daly, Superintendent, Lafayette Charity Hospital, Lafayette, Louisiana.

ANESTHETIST—NURSE, male or female. 113-bed hospital, staff of 3 nurse anesthetists. In Lake region of Minnesota. Contact immediately: Administrator, Lake Region Hospital, Fergus Falls, Minnesota.

NURSE ANESTHETISTS to work with five anesthesiologists in community serving 70,000. Salary open. Apply to Wm. D. Maher, M.D., 307 South 12th Avenue, Suite 7, Yakima, Wash.

WANTED: Nurse Anesthetist for 1000-bed teaching hospital. Staff of 4 Anesthesiologists, 7 Residents, and 8 Nurse Anesthetists. Salary range $4,920 to $6,144 annually with merit rating increases, 48 hour week, paid overtime, one month paid vacation, 15 days sick leave annually which can accumulate to 90 days; only emergency operations on Saturdays and Sundays. Please reply to Mrs. Geneva R. Watkins, Head Nurse Anesthetist, Anesthesia Dept., Medical College of Virginia, Richmond 19, Virginia. State age, qualifications and school of anesthesia.

WANTED: Registered Anesthetist for 50-bed hospital in small Eastern North Carolina community. Contact Bladen County Hospital, Elizabethtown, North Carolina.

WANTED: Nurse Anesthetist. 110-bed hospital, latest equipment; paid vacation; salary open. Apply: Mother M. Tharsilla, Sacred Heart Hospital, Havre, Montana.

NURSE ANESTHETIST for obstetrics. Salary open, 3 weeks vacation the first year, 12 days sick leave per year, accumulative. Apply Personnel Director, Methodist Hospital, 1600 West 6th Avenue, Gary, Indiana.

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WANTED NURSE ANESTHETIST — 38-bed general hospital. Arrangements made alternate call—week ends off. Salary open. Contact: Superintendent, Red Wing City Hospital, Red Wing, Minnesota.

WANTED: Surgical anesthetist for 150-bed general hospital central Nebraska. Excellent working conditions and personnel policies. $450.00 per month to $550.00 per month and full maintenance. Apply: Box M-28, Journal American Association of Nurse Anesthetists, Prudential Plaza, Chicago 1, Illinois.

WANTED: Nurse Anesthetist to be one of two on staff of small, homey hospital in Chesapeake Bay Region. Excellent salary with maintenance provided or liberal cash allowance. Contact: Charlotte Ager, Union Hospital, Elkton, Maryland.

Position for full time Nurse Anesthetist now open. Contact: Administrator, St. Joseph Mercy Hospital, 2200 East Grand Boulevard, Detroit 11, Mich.

ANESTHETIST—AANA member or eligible; two general hospitals—177 and 130-bed capacity; full accreditation; building expansion in progress; very attractive starting salary with periodic increases; 40 hour week; paid overtime; excellent employee benefits include life insurance, pension plan, and social security. Apply: C. J. Nouri, Personnel Director, St. Luke's Hospitals, Milwaukee 15, Wisconsin. Phone: Or. 1-2900.

NURSE ANESTHETISTS (two) for expanding services of functionally modern general hospital. Separate anesthesia and recovery rooms. All types of surgery including neuro and chest. Air conditioned five-room suite. City of 95,000 in Michigan's resort area. Minimum starting salary $500 per month (five-day forty-hour week) in addition to attractive call compensation. Personnel Director, 705 Cooper Street, Saginaw, Michigan.

NURSE ANESTHETIST: Immediate need for Nurse Anesthetist for O.B. Approved, privately-owned 150-bed general hospital in El Paso. Salary open. For further details reply to Bill Burton, Administrator, Southwestern General Hospital, 2001 Erie Street, El Paso, Texas.

REGISTERED NURSE ANESTHETISTS: Large university hospital using successful blend of anesthesiologists and nurse anesthetists. Wide variety surgical and anesthetic practice. Salary according to experience but counting call bonuses new graduates average $400 per month. Apply to Mrs. Helen M. Geiss, Chief Nurse Anesthetist, Strong Memorial Hospital, Rochester, New York.

Travel expenses for applicants selected for interview. Staff of five physicians, seven nurses. Write Department of Anesthesiology, University of Virginia, Charlottesville, Virginia.

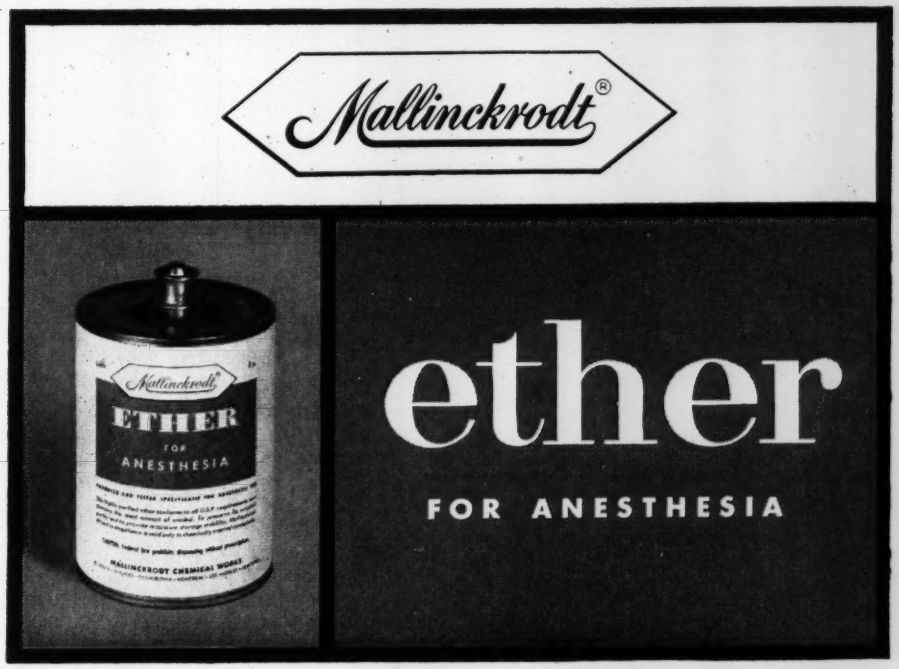
NURSE ANESTHETIST — 100-bed general hospital. Two anesthetist staff — rotating call and week ends off. Apply: Administrator, G. N. Wilcox Memorial Hospital, Lihue, Kauai, Territory of Hawaii.

NURSE ANESTHETISTS (2) needed for obstetrical anesthesia in centrally located, modern, approved teaching hospital. Monthly starting salary for 40 hour week is $450.00 with regular increases, holiday pay, sick leave and vacations. Medical Director, Woman's Hospital, Detroit 1, Mich.

ANESTHETIST: Registered Nurse. Modern 200-bed general hospital. Forty hour week. $435 to $487.50 per month. Paid vacations and sick leave. Overtime on liberal case basis. Medical anesthesiologist in charge. Apply: Chief of Department of Anesthesia, Pontiac General Hospital, Pontiac, Michigan.

NURSE ANESTHETIST — permanent. Part time night duty in O.B.; no weekends; salary open. Contact: Personnel Director, St. John's Hospital, 307 South Euclid Avenue, St. Louis 10, Missouri.

NURSE ANESTHETIST. Male or Female, AANA member or eligible. Excellent opportunity OB Anesthesia with emergency and surgical Anesthesia as staff expands. New hospital—40 hour week—extra compensation for call—vacation, sick leave, holidays, other fringe benefits. Excellent working conditions. Apply: Personnel Department, Community Hospital, 1500 North Ritter, Indianapolis, Indiana.



ANESTHETIST - NURSE: 250-bed general hospital; excellent working conditions and personnel policies. Write: Mr. Bert Stajich, Assistant Administrator, Columbia Hospital, 3321 N. Maryland Avenue, Milwaukee 11, Wisconsin.

This 185-bed general, non-profit, nonsectarian community hospital fully accredited by the Joint Commission on Accreditation and approved for internships by the American Medical Association, needs a nurse anesthetist. The total annual pay exceeds $6,000 per year. The staff of anesthetists consists of three nurse anesthetists fully qualified and are required to be either members of A.A.N.A. or eligible. The department is well equipped, and Heidbrink anesthesia machines are in use. Call is taken every third night and every third weekend, and additional payment is paid for each major case. Three weeks paid vacation, plus six paid holidays, plus sick time allowances are offered. The hospital is located in a resort city of 50,000 on Lake Michigan. Apply to Administrator Mr. C. T. Loftus, Mercy Hospital, Benton Harbor, Michigan.

MATURE NURSE ANESTHETIST desired by Anesthesia Department of major teaching-university hospital on Eastern seaboard to be head nurse anesthetist in large department consisting of anesthesiologists, residents and 12-16 nurse anesthetists, and to set up, organize and run an approved school for nurse anesthetists. Salary open. Personal interview essential, expenses paid. Send complete information on background, experience etc., with first letter to: Dr. N. M. Greene, Chief Anesthesiologist, Grace-New Haven Community Hospital, P.O. Box 1001, New Haven 4, Connecticut.

NURSE ANESTHETIST: to join Anesthesiologist-headed group in private practice of anesthesia. $500 per month to start - percentage after 3 months, with average income of about $750 per month. Rotating call every 4th night. City of 75,000 population in Southwest Louisiana. Write, giving qualifications and full particulars to: S. Garland Kent, M.D., 1901 Oak Park Boulevard, Lake Charles, Louisiana.

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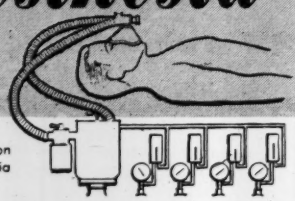


The New Ohio "Series 2000" Kinet-o-meter®

Ohio Chemical now introduces the new "Series 2000" Cabinet Kinet-o-meter designed to provide more exacting performance. Especially noteworthy are the following advantages of this new model:

THE "VERNI-TROL" VAPORIZER

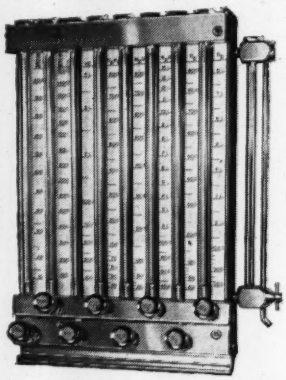
This new vaporizing system produces consistently high concentrations of ether vapor over long periods of time. The ether vapor is diluted with other metered gases to establish the desired concentration. Separate needle valves and flowmeters permit reproducible metering of oxygen through ether.

A special device circulates the liquid ether to facilitate absorption of heat from the surrounding area. This replaces heat lost through vaporization. The "VERNI-TROL" is an out-of-the-way spot. It is swiftly filled and easily drained.

CIRCUIT CONTROL VALVE

The circuit control valve permits quick change of the "VERNI-TROL" from "Ether On" to "Ether Off." Ether flowmeter settings remain the same. Inlet and outlet valves give a positive seal when "VERNI-TROL" is off. Opening oxygen flush valve shuts off ether flow.

LONG-SCALE FLOWMETERS



The 11-inch hand-calibrated flowmeters are easily read and their exceptional accuracy eliminates the need for "leveling devices." Two separate flowmeters each (high and low range) for oxygen, nitrous oxide and ether, provide an ample range for all techniques. Large visible floats are easily read against brilliant color background identifying the gases.

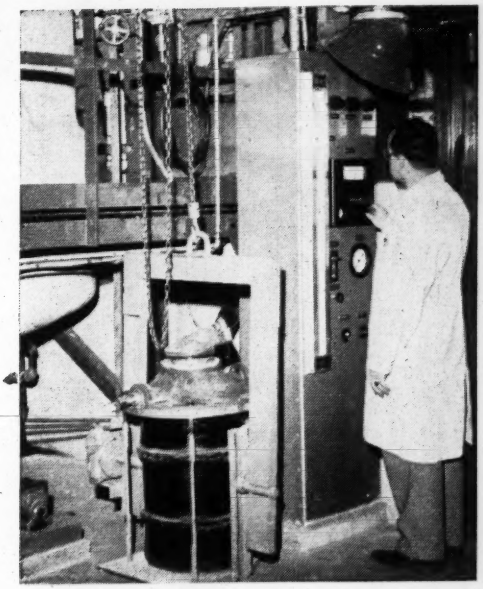
A separate needle valve is provided for each flowmeter. A positive stop on the needle valve knob prevents excessive closing. Knobs are quickly identified by color and gas symbols. Models available with long-scale flowmeters only—less "VERNI-TROL" vaporizer.

OTHER ADVANTAGES

In addition, the "Series 2000" Kinet-o-meter retains the "proved-in-use" features of the "Series 1000" Kinet-o-meter. All compatible accessories are available plus two new ones:

- B-D Mercury Column Type Blood Pressure Manometer Kit, complete with cuff, bulb, tubing, bladder and bracket
- A full-width handle for mounting on front or rear of cabinet

Catalog 4756 offers additional information, and our representative will be glad to call at your request to explain why the "Series 2000" Cabinet Kinet-o-meter is the ultimate in design and performance in an anesthesia machine.



OHIO OPENS NEW CYCLOPROPANE PLANT

Cyclopropane in anesthesia has grown steadily since Ohio Chemical first made it available in 1933. Within recent years, however, there has been a sharp increase in the demand for this excellent anesthetic. In order to keep production ahead of increasing consumption a new plant incorporating the latest technological developments and automatic controls has been erected and is now in operation at Cleveland, Ohio.

These modern facilities, supported by Ohio Chemical's 45 years' experience in the manufacture of medical gases, assures more efficient production of the high purity cyclopropane for which Ohio Chemical has been noted.

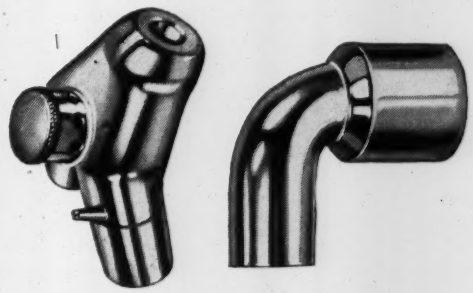
As in the past, raw materials are analyzed and must meet strict specifications before they are used in our process. During each stage of production and filling, the product is tested to insure that Ohio Chemical Cyclopropane is **99.5% pure or higher for delivery to the medical profession.**

MEDICAL ABSTRACTS

Endotracheal Anesthesia: Lack of Laryngeal Trauma After Use of the Carlens Catheter. In this article the authors review the literature for the nature of and incidence of trauma following the use of endotracheal tubes. Information on the use of the Carlens catheter is presented. The authors conducted a post endotracheal study on 206 patients who had endotracheal anesthesia with a Carlens catheter at least once. They report their findings as follows: "No laryngeal lesions were found in 204 of the 206 patients. One patient, following a left pneumonectomy, had paresis of the left vocal cord. The surgeon was certain that the left recurrent laryngeal nerve was damaged during dissection of dense adhesions around the arch of the aorta. One patient presented a purple, raised lesion on each vocal cord, probably a hematoma, when he was examined on the sixth postoperative day."

The author's conclusions were—"This systematic postoperative study of 206 patients on whom endotracheal intubation was performed with a Carlens double-lumen catheter has revealed no pathological condition attributable to the use of the tube."

" . . . it is thought that the advantages offered by the use of this tube, both as to the convenience to the surgeon and to the safety of the patient, warrant its further use." REF.: Siebecker, K. L., Land, J. F. —Anesthesiology—17:660;1956.



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During postoperative recovery

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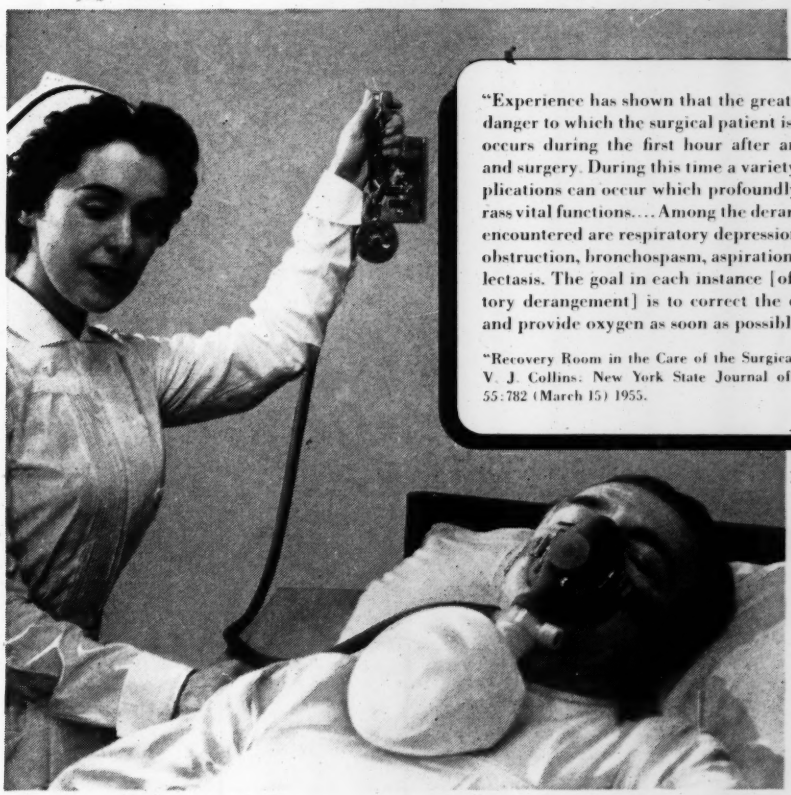

"Experience has shown that the greatest acute danger to which the surgical patient is exposed occurs during the first hour after anesthesia and surgery. During this time a variety of complications can occur which profoundly embarrass vital functions.... Among the derangements encountered are respiratory depression, apnea, obstruction, bronchospasm, aspiration and atelectasis. The goal in each instance [of respiratory derangement] is to correct the difficulty and provide oxygen as soon as possible."

"Recovery Room in the Care of the Surgical Patient," V. J. Collins. New York State Journal of Medicine 55:782 (March 15) 1955.

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